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DISCUSSIONS BETWEEN ECONOMIC AGENTS:

Time Series Analysis in Social Sciences

Authors:

Cemil Serhat AKIN
Cengiz AYTUN
Ceren PEHLIVAN
Filiz GUNEYSU ATASOY
Gökhan KONAT
Mehmet Levent ERDAS
Mehmet TEMİZ
Omer Faruk BICEN
Rabia EFEOGLU

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Editor: Assoc. Prof. Okyay UCAN

Authors: Assoc. Prof. Cengiz AYTUN
Assoc. Prof. Cemil Serhat AKIN
Asist. Prof. Filiz GUNEYSU ATASOY
Asist. Prof. Mehmet Levent ERDAS
Assist. Prof. Omer Faruk BICEN
Research Assistant Dr. Mehmet TEMİZ
Research Assistant Gökhan KONAT
Research Assistant Rabia EFEOGLU
PhD Student Ceren PEHLIVAN

İKSAD Publishing House

(The Licence Number of Publicator: 2014/31220)
TURKEY TR: +90 342 606 06 75
USA: +1 631 685 0 853
E mail: iksadyayinevi@gmail.com
kongreiksad@gmail.com
www.iksad.net
www.iksad.org.tr
www.iksadkongre.org

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DISCUSSIONS BETWEEN ECONOMIC AGENTS:

Time Series Analysis In Social Sciences

This book is the third one of “Discussions between Economic Agents” series. The subject- time series analysis- is totally used as a key point in each paper. A time series data set consists of two or more variables over time. So, time series data can have different time frequencies, such as hourly, weekly, quarterly and annual. Moreover, these data have to be arranged in chronological order. Most of the economic variable has been influenced by the past values of itself. That is these variables are integrated according to the influenced period times. If there is only one lag, we say it is I(1) i.e. integrated in first difference. Otherwise, if there is no influence from past to nominal value, the variable is called as stationary. To see whether the variable is stationary or has a unit root, a unit root test has to be applied. Such as, Augmented Dickey Fuller), Phillips Perron, Kwiatkowski-Phillips-Schmidt-Shin, Ng-Perron, Lee-Strazicich and etc. Following this test, according to the variables properties ordinary least square, cointegration and error correction analysis are done. In this context, the articles mentioned in the following paragraphs are related via the time series. There are seven valuable works in the book.

In the first chapter of the book, Cengiz AYTUN and Cemil Serhat AKIN prepared an analysis with the annual data from 1969-2018 in the study named “The Relationship between Tourism Income, Tourism Expenditure and Gross Domestic Product in Turkey: A Gradual Shift Causality Application”. Turkey’s leading growth performance is described by tourism income and tourism expenditures. Their findings suggest that tourism facilities raises the national income through the employment opportunities. So increasing tourism revenues will

be an effective policy tools for development and growth in Turkey.

In the second chapter, Gokhan KONAT and Mehmet TEMIZ in their work called “A study on Determinants of Foreign Direct Investment in Turkey”, examined the relationship between foreign direct investment, per capita GDP, inflation rate, openness and foreign trade deficit of Turkey for the period 1986-2018 by using data from Central Bank of Turkey and Turkey Statistical Institute. According to the study authors find that there is a casual relation from foreign direct investment to inflation and gross domestic product.

In the third part of the book, Filiz GUNEYSU ATASOY, the author of the study called “An Examination of the Impact of Military Coup Attempt on BIST”, analyzed the time series data with ordinary Least Square and One Way ANOVA approach using the daily data in the period of 01.01.204- 01.01.2018. In this study, two period that is before and after the attempt to military coup in 15th July 2016, are compared to have a presence of the possible anomalies on BIST 100. Like previous studies, author also finds that some anomalies are observed in the stock market.

In the fourth chapter of the book, Mehmet Levent ERDAS conducted the study named “What is the Link between Financial Development Indicators and Energy Consumption: Evidence from Turkey’s Economy”, in which he has analyzed relationship between financial development and energy consumption. Author uses annual data covering the period 1969-2015 to identify the symmetric and asymmetric causality between the variables. Hacker and Hatemi-J (2006) and Hatemi-J (2012) test results shows that there is a unidirectional causality from financial development to energy consumption.

On the other hand, author finds that there is no asymmetric causality.

In the fifth chapter, Ceren PEHLIVAN and Rabia EFEOGLU conducted a time series analysis using 1990-2018 period in the study named “Econometric Analysis of Migration-Informal Employment Relations in Turkey”. They investigated the relationship between migration and informal employment in Turkey. They found a long run relationship between the variables. Moreover, the causality between the variables are seen by using Toda Yamamoto test.

In the sixth chapter of the book, Omer Faruk BICEN prepared an analysis with the monthly data from 2006M1-2017M9 in the study named “The Determinants of Net Errors and Omissions”. The development of net errors and omissions in Turkey are observed in the paper. In the model author uses the net errors and omissions as the endogenous variable. Interest rate, industrial production index, real effective exchange rate, foreign exchange deposit account are the exogenous variables. His finding suggests that there is a long run relationship between the variables but no causality via Dolado Lütkepohl test.

“The Causality Relationship between Ecologic Footprint and Tourism Activities in Turkey” is the last chapter of the book. The authors, Cemil Serhat AKIN and Cengiz AYTUN, examined the casual relationship between the tourism income, expenditure and gross domestic product. Both unit root tests and causality tests are done. They get a solution that there is a unidirectional causality relationship from tourism income variables to ecologic footprint for the 1969-2016 period.

I would like to express my sincere gratitude to all the authors for their high quality contributions. In addition I would like to thank the IKSAD Publishing House managers and workers for their support during the publishing process of this book.

Assoc. Prof. Okyay UCAN

CHAPTER 1:

THE RELATIONSHIP BETWEEN TOURISM INCOME, TOURISM EXPENDITURE AND GROSS DOMESTIC PRODUCT IN TURKEY:

A GRADUAL SHIFT CAUSALITY APPLICATION

Assoc. Prof. Cengiz AYTUN[1]

Assoc. Prof. Cemil Serhat AKIN[2]

[1] Hatay Mustafa Kemal University. F.E.A.S. Department of Finance, cengizaytun@mku.edu.tr
[2] Hatay Mustafa Kemal University. F.E.A.S. Department Economics csakin@mku.edu.tr

INTRODUCTION

One of the most widely used policies for economic growth is tourism policy. Especially undeveloped or developing countries are trying to cover the current deficit problem with tourism revenues. Tourism is an export item, which is included in the international services item of the balance of payments and current account. 1980's to embrace the export-oriented growth model has been shaped with Turkey's tourism Policies in this direction. Firstly, in 1982, the Tourism Incentive Law provided significant investment and financial support to the sector. In 1983, tourism policies based on tourism sector were emphasized.

The institutional structures established to increase foreign trade are also thought to increase tourism revenues. On the other hand, this liberal policies provided may cause the current account deficit of developing countries. Imports to meet the demands of foreign tourists especially luxury goods, in tourism activities may contribute to the increase in the current account deficit. Therefore, while the relationship between tourism revenues and economic growth is questioned during the liberalization process, export and import should be included in economic analysis.

The aim of the study is to question the effect of tourism on economic performance by considering foreign trade. The purpose of the analysis is to reveal the direction of the interactions rather than the coefficient search. For this reason, it is questioned whether there is a

causal relationship between tourism revenues and economic growth and export and import.

1. Literature

Tourism sector is one of the important sectors of national economies due to its contribution to economic growth and employment opportunities it creates. While tourism revenues recorded in the current account and international services section of the balance of payments is an invisible export item. In addition, tourism activities lead to positive externalities such as stimulate competition, resulting in more effective and efficient use of resources. With these developments, the impact of tourism activities in the economy is similar to the impact of exports and affects economic growth positively (Samırkaş and Bahar, 2013). In addition, while the income generated by tourism activities contributes to economic growth, the services offered contribute to economic development by improving the quality of life.

Another impact that the tourism sector has created in the economy is that it creates dynamism by creating secondary demand in the food and construction sectors, which are sub-sectors. With the increase in tourism activities and the increase in the number of tourists, physical investments in the region increase, thus the construction sector leads to growth in secondary sectors such as automotive sector and agriculture sector. The increase in mobility in the region causes the public investments to be directed towards this region and the public also creates new employment opportunities. Chained economic reactions increase the level of prosperity in the region (Stynes and White, 2006).

The literature of the tourism and economic growth is based on three different hypotheses. These; Tourism-based economic growth hypothesis, economic growth-based tourism growth hypothesis and two-way causality hypothesis (Fayed and Fletcher, 2002).

Tourism-based economic growth hypothesis advocating a causal relationship from tourism to economic growth. Thanks to the tourism sector, these countries will be able to generate more foreign exchange revenue by exporting services and at the same time create employment opportunities and increase national income. According to this approach, the increase in national income will increase the tax revenues of the state and provide financial resources for infrastructure investments. Since the increase in infrastructure investments directly affects the quality of life, it will take place in economic development as well as economic growth. In addition, the use of technological facilities for promotional activities will facilitate the increase in human capital and facilitate adaptation to new technologies.

Another effect of tourism on economic growth emerges with its multiplier effect. Accommodation and food expenditures made by the customers served in the tourism sector increase the dynamism in the economy and increase the income by giving rise to new expenditures with the effect of increasing (Kan, Phang and Toh, 1995). The tourism sector, where consumption tendency is high, ensures a high turnover of expenditures and the multiplier effect becomes more pronounced and the income generated increases.

In a study conducted by Balaguer and Cantavella-Jorda for Spain in 2002, they concluded that used unidirectional causality from tourism income to economic growth and tourism contributed to the economic growth of Spain and this effect continued in the long term.

Durbarry's (2004) study in Mauritius questions the relationship between tourism and economic growth and supports the hypothesis of tourism-based economic growth. Durbarry concluded that tourism is the most important determinant of Mauritius' economic growth.

Martin et al. (2004) in a study conducted in 21 Latin American countries by using Panel data analysis, the relationship between economic growth and tourism was questioned and concluded that tourism positively affected the economic growth of low and middle income countries.

Parilla, Font and Nadal (2007) concluded that tourism was a driving force in the economic growth and regional development of Spain and Canary Islands.

Cortes (2008) showed that national and international tourism had positive effects on economic growth between 1990 and 2004 in his study for Spain and Italy.

Brida et al., Who questioned the relationship between Chile's tourism income and economic growth variables with Johansen Cointegration and Granger causality tests. (2008) concluded that the increase in tourism income is the cause of economic growth. A similar study was conducted by Lean and Tang (2009) for Malaysia, Belloumi

(2010) for Brida, Punzo and Risso (2011) for Brazil and it was stated that the direction of the impact was from tourism to economic growth.

In studies it was mainly found in Turkey are subject to a causality of economic growth from tourism. The direction of this effect is also expressed as positive

Arslantürk and Atan (2012), his work on the growth of the 2009 term with Turkey, 1987, exchange rate and tourism revenue data for time series analysis and questioned in the obtained results tourism revenue was stated to be a causal economic growth.

Alp (2010), working in the tourism sector in Turkey has questioned the relationship between economic growth and economic growth in the tourism revenue has reached to the conclusion that a positive impact on after a certain level.

Özdemir and Öksüzler (2006) questioned the causal relationship between real exchange rate and tourism revenues with GDP in their study for 1963 and 2003 period, and found a unidirectional causality relationship from tourism revenues to GDP in the short and long term.

Gündüz and Hatemi (2005) study carried out by using annual data for the 1963-2000 period, Turkey causality analysis was performed. According to the results of the analysis, it is determined that there is a one-way causality from tourism to economic growth. In conclusion it is stated that the hypothesis is valid for directional growth of tourism in Turkey.

According to the approach that argues that causality between economic growth and tourism is from growth to tourism, economically strong economies create new tourism opportunities and increase tourism revenues by using the resources available. Restoring historical places and cultural heritage to tourism, organizing activities for tourism activities such as skiing, mountain hiking, diving sports in accordance with geographical conditions, and making necessary infrastructure and institutional arrangements for transportation, which is one of the main requirements of tourism, require large monetary expenditures. In this case, only high-income countries can make these investments and take more share from global tourism demand.

Lean and Tang (2009) used the economic growth, tourism revenues and exchange rate variables of Malaysia between 1989 and 2009. In the findings, economic growth is the causal factor of tourism revenues.

Studies supporting tourism hypothesis focused on economic growth; Odhiambo (2011) examined the relationship between economic growth, foreign exchange and tourism revenues by taking Tanzania's 1980-2008 period. According to the findings, long-term economic growth is the causal factor of tourism revenues.

Oh (2005) supports the hypothesis of tourism growth based on economic growth. In his study, he questioned the short and long term relationship between tourism and economic growth for the Korean economy and obtained a short-term causality relationship from economic growth to tourism only. As a result of the study, it was stated

that economic growth in Korea is not a cause of tourism, but rather tourism is a cause of economic growth.

Findings that economic growth is a causal factor in tourism have also been found in studies conducted for Turkey. Kanca (2015) study that was done this for Turkey has the right Granger causality of economic growth from tourism revenues. Empirical evidence that tourism revenues positively affect growth has been obtained (Kanca, 2015).

Selim et al. (2015), working with tourism for the period 1980 to 2012 in Turkey has reached the conclusion that unidirectional causality from economic growth to tourism revenue.

According to the approaches that argue that the causality between economic growth and tourism revenues is biderctional, economic growth creates new opportunities for tourism while increasing tourism activities contribute to national income. From this perspective, this interaction is the driving force of economic and tourism activities.

Khoshnevis Yazdi et al. (2017) analyzed the relationship between Iran, tourism, foreign direct investment and economic growth. As a result of the study which covered the period between 1985 and 2013, it was concluded that there is a two-way causality between tourism expenditures and economic growth.

Aslan (2013) examined the relationship between tourism revenues, exchange rate and economic growth using the 1995 and 2010 annual data of 12 countries on the Mediterranean coast. According to

the findings Portugal, Israel and Turkey with tourism revenues are bidirectional causality between economic growth.

Kim, Ming-Hsiang and SooCheong (2005) examined the causal relationship between tourism expansion and economic growth in Taiwan, and there is a long-term relationship and two-way causality between tourism and economic growth.

Dritsakis (2004) analyzed the relationship between Greece's economic growth, tourism revenues and exchange rates for the period 1960–2000. According to empirical results, it has found a two-way causality between tourism revenues and economic growth.

Narayan and Prasad's (2003) study for Fiji found a reciprocal relationship between tourism revenues and real GDP. In this study, the direction of causality changes in the long and short term. It is concluded that tourism revenues are the causal of real GDP in the long term but real GDP is causal of tourism revenues in the short term.

Khalil et al. (2007) investigated the relationship between tourism revenues and economic growth of Pakistan during 1960 and 2005, and found a two-way causality relationship between tourism revenues and economic growth.

In studies conducted by the tourism income in Turkey has reached the conclusion that the bidirectional causality between economic growth. Topçuoğlu and Bozkurt (2013), for the period 1970-2011 found that two-way causality between the share of tourism income in exports and growth in the short and long term for Turkey.

Coban and Ozcan (2013), the relationship between tourism and economic growth in Turkey during 1963 to 2010 were analyzed for the short and long term. According to the findings, there is a two-way relationship between tourism revenue and economic growth.

Bahar (2006) study for Turkey examined using tourism revenues and GDP for the period 1963-2004 were analyzed result of the VAR model of tourism's economic growth has been concluded that there is a reciprocal relationship in the long term.

In the related literature, there are studies showing that there is no relationship between tourism revenues and economic growth. Yavuz (2006) In his study in Turkey for the period 1992: 1-2004: 4 could not find a causal relationship between economic growth and tourism income

Hepaktan and Çınar (2010) tested the effects of the variables of net tourism income and the number of foreign tourists on the growth and balance of payments by causality analysis in their studies covering the period 1980-2008. As a result of the analysis, it is concluded that tourism sector has an effect on foreign trade balance but it has no effect on economic growth.

2. Method

The data used in this study for Turkey was obtained from World Bank and Turkey Travel Agencies Union. The data covers the period 1969-2018 annually. The definitions and sources of related to data are presented in Table 1.

Table 1. Data Definitions and Sources (1969-2018, Annual)

Code	Definitions	Source
GDP	Gross domestic product (USD)	WDI[a]
TINC	Tourism income (USD)	ATTA[b]
TEXP	Tourism expenditures (USD)	ATTA[b]

[a] World Bank, World Development Indicators. 20.09.2019 [b]Association of Turkish Travel Agencies (https://www.tursab.org.tr//assets/img/ turizm-verileri/ turizm-geliri-1969-2018.xls) Accessed 20.09.2019.

In this study we analyzed the causal relationship between gross domestic product and tourism income and expenditure. According to the causality test developed by Granger (1969) a dependent variable (Y_t) can most effectively be explained by its lagged values (such as Y_{t-1}, Y_{t-2}, Y_{t-3}). The idea of explaining an economic phenomenon with its past values is consistent with economic common sense. In the following equation (Eq.1) Granger added lagged (p) values of the explanatory variable (X_{t-p}) with lagged values of the dependent variable (X_{t-p}), then tested the significance of the lagged coefficients together ($H_0\ for\ WALD\ test: X \nrightarrow Y,\ \theta_1 = \theta_2 = \cdots = \theta_p = 0$). For this VAR(p) based causality model, rejecting H_0 means that X significantly causes Y in Granger sense.

$$Y_t = \alpha_0 + \sum_{i=1}^{p} \beta_i Y_{t-p} + \sum_{i=1}^{p} \theta_i X_{t-p} + e_t \qquad (1)$$

If we adapt this VAR(p) based test to our work, the causality model between the gross domestic product and tourism income can be expressed by the following equation system (Eq.3-4).

$$GDP_t = \alpha_0 + \sum_{i=1}^{p} \beta_i GDP_{t-p} + \sum_{i=1}^{p} \theta_i TINC_{t-p} + e_t \quad (3)$$

$$TUR_t = \delta_0 + \sum_{i=1}^{p} \vartheta_i TINC_{t-p} + \sum_{i=1}^{k} \mu_i GDP_{t-p} + \varepsilon_t \quad (4)$$

In this type causality analysis, each series in the model must be stationary. WALD test statistics for non-stationary an cointegrated series do not fit asymptotic chi-square distribution. Due to WALD test statistic has a chi-square asymptotic distribution this approach cannot be applied in non-stationary series. Testing by differenced variables may be a solution. However, this method loses the long-term information. The results of the causality test with differenced variables can be interpreted for short-term. To overcome this problem, Toda and Yamamato (1995) (TY) has developed modified WALD test (MWALD). Non stationarity or cointegration relationship situations of the variables does not affect the significance and validity of the test. Testing by variables in level form also preserves the long-term information. Therefore, causality test results can be interpreted for long-term. Optimal lag number (p) is obtained from the VAR model. Additional lags are used for modifying the WALD test statistics. Maximum number of integration order (d) is determined by the unit root tests. VAR(p+d) model (Eq.4-5) is estimated for p+d lags by OLS or SUR estimator.

$$GDP_t = \alpha_0 + \sum_{i=1}^{p+d} \beta_i GDP_{t-(p+d)} + \sum_{i=1}^{p+d} \theta_i TINC_{t-(p+d)} + e_t \quad (4)$$

$$TINC_t = \delta_0 + \sum_{i=1}^{p+d} \vartheta_i TINC_{t-(p+d)} + \sum_{i=1}^{p+d} \mu_i GDP_{t-(p+d)} + \varepsilon_t \quad (5)$$

With these additional lags MWALD test statistics fits chi-square asymptotic distribution. Then the significance of the lagged coefficients tested together for p lags (H_0 for MWALD : $TINC \nrightarrow GDP$, $\theta_1 = \theta_2 = \cdots = \theta_p = 0$). Rejecting H_0 means that TINC significantly causes GDP in Granger sense with Toda and Yamamato (1995) MWALD modification.

But simulation studies made by Hacker and Hatemi-J (2006) showed that MWALD statistics is biased for the rejection H_0 hypothesis. According to the study, in the conditions of small sample size and error term processes (homoscedasticity or ARCH) MWALD test performs poorly. To solve this problem, they suggest using critical values obtained leveraged bootstrap distribution developed by Efron (1979). Monte Carlo simulation results for bootstrap method prove that an MWALD test based on a bootstrap distribution has much smaller size distortions than corresponding situations when the asymptotic distribution is employed. These results hold for various sample sizes, integration orders, and error term processes (homoscedastic or ARCH).

Another criticism about series and causality models is ignoring of structural changes. To resolve this problem, Enders and Jones (2015) suggest adding Fourier approximation terms in standard Granger causality VAR (p) model. Nazlioglu et al. (2016) also apply this solution to bootstrap Toda-Yamamoto model. In this augmented model (Eq.6) constant term ($\alpha_{(t)}$) varies as function of time and express structural changes in GDP_t.

$$GDP_t = \alpha_{(t)} + \sum_{i=1}^{p+d} \beta_i GDP_{t-(p+d)} + \sum_{i=1}^{p+d} \theta_i TINC_{t-(p+d)} + e_t \tag{6}$$

$$\alpha_{(t)} \cong \alpha_0 + \sum_{k=1}^{n} \gamma_{1k} \sin\left(\frac{2\pi kt}{T}\right) + \sum_{k=1}^{n} \gamma_{1k} \cos\left(\frac{2\pi kt}{T}\right) \tag{7}$$

Once these Fourier approximation terms are added, the optimum amount of lag and frequency combination (p, k) is calculated as in the previous model by using minimal information criterion value. The usual approach of the sequential procedure is using information criterion like Schwarz or Akaike.

$$GDP_t = \alpha_0 + \sum_{k=1}^{n} \gamma_{1k} \sin\left(\frac{2\pi kt}{T}\right) + \sum_{k=1}^{n} \gamma_{1k} \cos\left(\frac{2\pi kt}{T}\right) + \sum_{i=1}^{p+d} \beta_i GDP_{t-(p+d)} + \sum_{i=1}^{p+d} \theta_i TINC_{t-(p+d)} + e_t \tag{8}$$

$$TINC_t = \delta_0 + \sum_{k=1}^{n} \rho_{1k} \sin\left(\frac{2\pi kt}{T}\right) + \sum_{k=1}^{n} \rho_{1k} \cos\left(\frac{2\pi kt}{T}\right) + \sum_{i=1}^{p+d} \vartheta_i TINC_{t-(p+d)} + \sum_{i=1}^{p+d} \mu_i GDP_{t-(p+d)} + \varepsilon_t \quad (9)$$

In this functional form testing the null of the non-causality hypothesis is the same as VAR(p+d). Another criticism is on the weak small sample properties of the Wald statistics. To overcome this weakness, Lütkepohl (2005) offers that using F-statistics. Also, in the most recent research, to increase the power of statistical tests, the use of the bootstrap distribution values for t-statistics are recommended (Mantalos,2000; Hatemi-J, 2002; Hacker and Hatemi-J, 2006; Balcilar, et al., 2010). With this point of view, Nazlioglu et al. (2016) employ residual sampling bootstrap method originally developed by Efron (1979) to obtain the critical values of F-statistics. Lastly, the significance of the lagged coefficients tested together for p lags and k frequencies (H_0 for $\mathrm{F-test}: TINC \nrightarrow GDP$, $\theta_1 = \theta_2 = \cdots = \theta_p = 0$). Rejecting H_0 means that TINC significantly causes GDP in Granger sense with Nazlioglu et.al. (2016) approach.

3. Results and Discussion

The TY based causality approach requires the information of the maximum integration degree of the series in the VAR (p+d) model. For define the maximum integration level of the series we simply applied unit root tests to the series. The first unit root test is the conventional

ADF test developed by Dickey and Fuller (1979) that doesn't consider structural shifts in the series. As second, in order to control structural changes in the series we also employed two breaks LM test developed by Lee & Strazicich (2003) and Fourier ADF test developed by Enders & Lee (2012). Lee & Strazicich (2003) recommend an endogenous two-break Lagrange multiplier unit root test that allows for breaks under both the null and alternative hypotheses. Rejection of the null hypothesis clearly indicates trend stationarity. But, Lee & Strazicich's (2003) test has been subjected to criticism. Enders & Lee (2012, p.196) criticizes Lee and Strazicich (2003) for do not consider more than two structural breaks, since a test with many endogenous breaks is not likely to have much power. When the breaks are of opposite sign, Prodan (2008) shows that it can be quite difficult to properly estimate the number and the magnitudes of multiple breaks. Smooth transition function forms are also used to modelling structural breaks gradually instead of dummy variable approach. These dummy variable and smooth transition approaches have important limitations. The both approaches needs the information of break dates and functional form of gradual shifts (Nazlioglu et al., 2016, p.172). As a solution Enders & Lee (2012) augments conventional ADF test by Fourier approximation to capture structural breaks. The Fourier approximation does not require a prior knowledge on the number, dates, and form of breaks and accounts structural changes as a gradual/smooth process by employing a small number of low frequency factors (Nazlioglu et al., 2016, p.172).

Unit root test result are presented in Table 2. All unit root tests show that all series has unit root at level and stationary at first differences. Tests considering fractures also indicate structural breaks. In Lee & Strazicich (2003) test, the breaking dates for GDP are 1995 and 2008. These dates indicate that 1994 and 2008 crises. The results of the unit root tests for all series indicate that the maximum order of integration is one, I(1), so that d = 1.

Table 2: Unit Root Test Results

	ADF (1979)		**Two breaks LM test Lee & Strazicich (2003)**				**Fourier ADF Enders & Lee (2012)**		
Seri	ADF-stat Level	ADF-stat Diff.	LM-stat	Break dates	Fraction	Critical Val. 1%, 5%, 10%	ADF-stat	Fourier	Critical Val. 1%, 5%, 10%
GDP	1.8472 (1.000)	-6.2990 *** (0.000)	-4.589[b]	1995 2008	0.54 0.80	-6.320 -5.730 -5.320	-1.718[b]	1	-4.950 -4.350 -4.050
TINC	-1.8736 (0.653)	-7.1612 *** (0.000)	-2.670[a]	2002 2012	0.68 0.88	-4.545 -3.842 -3.504	-3.429[b]	1	-4.950 -4.350 -4.050
TEXP	-1.8441 (0.668)	-6.1240 *** (0.000)	-2.300[a]	2006 2012	0.76 0.88	-4.545 -3.842 -3.504	-2.417[b]	1	-4.950 -4.350 -4.050

Notes: H_0: No unit root. ***, **, and * denote rejection of null hypothesis at statistical significance level 1, 5, and 10 percent respectively. Optimal lag and frequency numbers for unit root tests based on Schwarz-Bayesian information criterion. P-values reported in parenthesis. The reported ADF test statistics calculated for the model with constant and trend. [a] Break in level, [b] Break in level and trend.

Causality test results are presented in Table 3. After the sequential minimization process optimal lag and frequency numbers for the VAR (p+k) model are p=2, k=3. According to the findings, there is a bidirectional causality between tourism income and income level. Findings also indicate that there is no causality between tourism expenditures and income.

Table 3. Fourier Augmented Bootstrap Toda & Yamamoto Causality Test Results

H_0	F-statistics	Asymptotic p-value	Bootstrap p-value	Optimal lags (p) and frequencies (k)	Decision
TINC $\nrightarrow$ GDP	6.4907 *	0.0390	0.0509	p=2, k=3	$TINC \leftrightarrow GDP$
GDP $\nrightarrow$ TINC	10.3086 **	0.0058	0.0115	p=2, k=3	
TEXP $\nrightarrow$ GDP	2.5495	0.2795	0.2982	p=2, k=3	No causality
GDP $\nrightarrow$ TEXP	2.2557	0.3237	0.3382	p=2, k=3	

Notes: Bootstrap p-values are based on 10,000 repetitions. According to unit root test results, the maximum order of integration is one (d = 1). Optimal lag and frequency numbers for the VAR model based on Schwarz-Bayesian information criterion. ***, **, and * denote rejection of non-causality hypothesis at statistical significance level 1, 5, and 10 percent respectively. $\leftrightarrow$ indicates that there is a bidirectional causality between the variables.

The unidirectional causality relationship from tourism income to gross domestic product supports the hypothesis of economic growth based on tourism (Fayed and Fletcher, 2002). The findings obtained support the studies carried out for various countries in this direction (Durbarry, 2004; Martin et al., 2004; Parilla, Font and Nadal, 2007; Brida et al., 2008; Lean and Tang, 2009; Belloumi, 2010; Brida, Punzo and Risso, 2011).

A comparison with past survey conducted for Turkey, Gündüz an Hatemi (2005) also found that unidirectional causality from tourism income to the Real GDP. On the other hand findings, the study revealed that there is a mutual causality for Turkey (Gündüz, 2006 ; Yavuz, 2006; Hepaktan and Cinar, 2010) These differences may be attributed to the fact that past studies were conducted with smaller samples and the methods used were limited in their ability to overcome the problems.

Our findings suggest that tourism-oriented growth policies suggesting that the foreign trade deficit can be reduced by providing

service exports through. As well tourism facilities create employment opportunities so raise national income. Increasing national income will also increase the tax revenues of the state and provide financial resources for infrastructure investments. The increasing infrastructure investments will directly affect the quality of life and will support economic development efforts as well as economic growth. In addition, the use of technological facilities for promotional activities will facilitate the increase in human capital and facilitate adaptation to new technologies. There are also positive externalities created by tourism activities in non-sectoral areas. In this way, more efficient results can be achieved in resource allocation and efficiency which can revive the competition. The additional demand created by tourism in sub-sectors such as food, construction, textile and furniture can also revive these sectors. As a result, the policy aims to increase tourism revenues to support economic growth and development policy in Turkey is presented as a proposal would be an effective policy tool.

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CHAPTER 2:

A STUDY ON DETERMINANTS OF FOREIGN DIRECT INVESTMENTS IN TURKEY

Research Assistant Gökhan KONAT[1]

Research Assistant Dr. Mehmet TEMİZ[2]

[1] Inonu University, Department of Econometrics, Malatya, Turkey

[2] Firat University, Department of Economics, Elazig, Turkey

INTRODUCTION

One of the major problems faced by developing countries such as Turkey is the domestic capital deficiency. Foreign direct investment plays an important role in supplying the capital needed for financing of growth. Foreign direct investments are defined as acquiring a whole established company or becoming a partner or establishing a facility from the beginning for international investors in a foreign country. It is important to identify the factors that attract these investments to the country, because of their benefits in terms of employment, competition, productivity and technological development of the developing countries.

International capital flows to related countries are realized in two ways: foreign direct investments and portfolio investments. Foreign direct investments can be done by acquiring or becoming a partner of an established company or building a new factory from scratch. In addition to capital inflow, features such as technology, management knowledge and participation in management are also transferred by foreign direct investments (Karluk, 2009: 688).

In developing countries, a significant portion of the national income should be devoted to investments in order to achieve sufficient development. Since savings need to be increased in order to increase investments, high investments depends on increasing savings. For these countries, gap in savings can be compensated through external borrowing, but there is also a limit to external borrowing. Therefore, attracting foreign direct investment to the country can be used as a successful method (Koyuncu, 2010: 57).

It is important to identify the factors that attract these investments to the country, because of their benefits in terms of employment, competition, productivity and technological development of the developing countries. So, it is important to make this work for a developing country such as Turkey.

1. RELATED LITERATURE

Past studies about the determinants of foreign direct investments in Turkey, the methods used in this studies and the findings of them will be listed in this section.

Erdal & Tataoğlu (2002), examined the relation between foreign direct investments and its determinants in Turkey for the period of 1980-1998 by using regression analysis. Results showed that, market size, infrastructure, growth rate and openness variables affect FDI positively, on contrary exchange rate instability affect FDI negatively. No significant effect was found from interest rates to FDI. Deichmanns et al. (2003), investigated the relation between FDI and several variables by using logit model during the period 1980-2000 for Turkey. As a result, positive relationship was found between FDIs and income level, infrastructure facilities and skilled labor variables. Negative relationship was found between FDIs and share of agriculture in economy and share of public investments in national income. Yapraklı (2006), investigated the relation between FDIs and chosen macroeconomic variables, in Turkey, for the period 1970-2006. Cointegration and Error Correction Model used as econometric method. Results showed that, FDIs were positively affected from GDP and

openness while negatively affected from wages, real exchange rate and foreign trade.

Berköz and Türk (2007), analyzed the FDIs and its determinants within the period of 1990-2003 for Turkey with multiple regression analysis. According to analysis results; GDP growth, infrastructure, bank lending and population growth increased FDIs. Karagöz (2007), used cointegration, Error Correction Model and causality analysis to test the relation between FDIs and their determinants. Results of the study applied for Turkey during the period 1970-2005 showed significant relationship between FDI and openness and FDIs delayed values for one period. Susam (2008), examined the direction of FDIs relation with macroeconomic variables in Turkey with quarterly data between 1998-2007 with regression analysis. As a result, there was a negative relationship between FDI and growth rate and inflation; a positive relationship between public sector share, budget deficit, openness and domestic investments. Kar and Tatlısöz (2008), investigated the direction of FDIs relation with several variables in Turkey between 1980-2003 with regression analysis. They found a positive correlation between FDI and GNP, openness, international reserves and investment incentives; a negative relationship between real exchange rate and wages and FDI.

Tarı and Bıldırdı (2009), by using cointegration and Error Correction Model as method concluded that GDP and openness had a positive; wages and inflation had a negative impact on FDI within the period 1990-2006 in Turkey. Koyuncu (2010), examined the relation between foreign direct investments and its determinants in Turkey for

the period of 1980-1998 by using SVAR model. It has been concluded that FDI inflows were significantly affected by the previous values of FDI, GDP, openness and net international reserves. Aytekin (2011), used multiple regression analysis to test the relationship between FDIs and several macroeconomic variables for Turkey during the period 1998-2010. A positive relationship was found between GDP and foreign exchange reserves and FDI, while a negative relationship was found between interest rates and external debt and FDI.

Emir et al. (2013), examined the relation between FDIs and its determinants fort the period of 1980-2003 in Turkey. Results showed that, FDIs were positively affected by GDP and country credit ratings; negatively affected by political risk and external deficit variables. Çiftçi and Yıldız (2015), in their study anlyzing the factors affecting FDIs to Turkey in the period of 1974-2012 used ARDL bound test and error correction models. Both method give the result of long term relationship between variables. GDP, Exchange rate and financial development affect FDI positively, on contrary external debt and trade deficit has a negative effect. Lastly Aydemir and Genç (2015), investigated the relation between FDIs and macroeconomic variables by using cointegration and Dynamic Least Squares Method during the period 1991-2014 for Turkey. Results showed a positive correlation between openness and GDP variables and FDI, and a negative correlation between inflation and FDI.

When the studies carried out on the subject are examined, it is seen that there is no consensus on the factors affecting the direct investments. As the determinants of FDI, different variables come to

the fore. It is due to the difference of the country or country group, period analyzed and the econometric method used.

2. DATA, METHODOLOGY AND FINDINGS

In this section; information about the data, methods used and findings will be given.

DATA

In this study, relationship between foreign direct investment in Turkey and per capita GDP, inflation rate (CPI), openness, foreign trade deficit variables between the years 1986-2018 were analyzed. The data used in this study obtained from the website of CBT Electronic Data Distribution System (EVDS) and Turkey Statistical Institute (TÜİK).

METHODOLOGY

Firstly, the stationarity of all series is examined by the Augmented Dickey-Fuller (ADF) unit root test. Then, the existence of cointegration relationship between the series was investigated using cointegration test proposed by Bayer and Hanck (2012). Lastly, the Toda-Yamamoto Causality Test was applied to the series for determining the causality relationship.

Dickey-Fuller (1979) unit root test, which forms the basis of unit root tests, is based on the assumption that there is no autocorrelation in error terms. Dickey and Fuller (1981), taking this deficiency into consideration, included the lagged values of dependent variable into

Dickey-Fuller(1979) unit root model. Thus, they aimed to eliminate the problem of autocorrelation. Model is as follows;

$$\Delta Y_t = \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + u_t \quad (1)$$

Model A (model without constant and trend)

$$\Delta Y_t = \beta_1 + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + u_t \quad (2)$$

Model B (model with constant)

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + u_t \quad (3)$$

Model C (model with constant and trend)

The appropriate lag length is determined using information criteria. The hypotheses generated for the Augmented Dickey Fuller (ADF) unit root test are as follows:

$$H_0: \delta = 0, \qquad Series\ has\ unit\ root$$

$$H_1: \delta < 0, \qquad Series\ \ is\ stable$$

The existence of the cointegration relationship between the series was investigated by Bayer and Hanck (2012) cointegration test. Bayer ve Hanck (2012) cointegration test developed with the combination of tests; Engle ve Granger (1987), Johansen (1991), Boswijk (1994) and Banerjee vd. (1998). Bayer and Hanck (2012) cointegration test is based on combining the calculated probability values of combined cointegration tests with Fisher (1932) formulas. Model is as follows:

$$\tilde{X}_I^2 = -2\sum_{i\in I}\ln(p_i) \quad (4)$$

$$EG-JOH = -2[\ln(PEG)+\ln(PJOH)] \quad (5)$$

$$EG-JOH-BOH-BDM = -2[\ln(PEG)+\ln(PJOH)+ \ln(PBOH)+\ln(PBDM)] \quad (6)$$

Here, PEG ; Engle ve Granger (1987), $PJOH$; Johansen (1988), PBO ; Boswijk (1994), $PBDM$; Banerjee vd. (1998) express the probability values of cointegration tests.

Toda-Yamamoto (1995) causality test is a simple approach based on estimation of improved vector autoregressive models (VAR). Toda and Yamamoto (1995) use extended VAR established at level values in the causality test. The first step in the Toda-Yamamoto (1995) method is to determine the appropriate delay level (*p*) in the VAR model. In the next section, the highest integrated degree of integration *(dmax)* is added to the delay *p*. The appropriate lag length is determined using information criteria. In the third and final stage, the OLS model is estimated on the level values of the series for the delay length *p+dmax*. VAR model developed by Toda and Yamamoto (1995) is applied with the help of the following equations:

$$Y_t = \lambda_1 + \sum_{i=1}^{p}\beta_{1i}Y_{t-i} + \sum_{j=p+1}^{p+dmax}\beta_{1j}Y_{t-j} + \sum_{i=1}^{p}\alpha_{1i}X_{t-i} + \sum_{j=p+1}^{p+dmax}\alpha_{1j}X_{t-j} + u_{1t} \quad (7)$$

$$X_t = \lambda_2 + \sum_{i=1}^{p}\delta_{2i}X_{t-i} + \sum_{j=p+1}^{p+dmax}\delta_{2j}X_{t-j} + \sum_{i=1}^{p}\vartheta_{2i}Y_{t-i} + \sum_{j=p+1}^{p+dmax}\vartheta_{2j}Y_{t-j} + u_{2t} \quad (8)$$

Toda and Yamamoto (1995) have an asymptotic χ^2 distribution of the MWALD test in a VAR system of (p+$dmax$) degree to be estimated. To test for the presence of Granger causality from Y to X, the $\alpha_{1i} \neq 0$ constraint is tested using the Wald statistic. To test causality from X to Y, the $\vartheta_{2i} \neq 0$ constraint is tested.

FINDINGS

Results of the tests applied will be offered in the order with the help of the tables.

Table 2: Augmented Dickey Fuller Unit Root Test Results

Variables	*ADF Test Statistic*	*Critical Values*		
		(%1)	*(%5)*	*(%10)*
dyy	-2.222 (7)	-4.340	-3.588	-3.229
Δ dyy	-3.390 (5)*	-4.324	-3.581	-3.225
kbgsyih	-2.092 (3)	-4.285	-3.563	-3.215
Δ kbgsyih	-5.242 (0)***	-4.263	-3.553	-3.210
dao	-3.154 (7)	-4.340	-3.588	-3.229
Δ dao	-3.729 (7)**	-4.356	-3.595	-3.233
dta	-2.754 (0)	-4.253	-3.548	-3.207
Δ dta	-6.828 (0)***	-4.263	-3.553	-3.210
enf	-2.986 (7)	-4.339	-3.588	-3.229
Δ enf	-8.161 (0)***	-4.263	-3.553	-3.210

Note: ***,** and * shows respectively the significance for %1, %5 and %10 levels.

Δdyy, *Δdao*, *Δdta*, *Δenf* and *Δkbgsyih* are respetively the first-order difference values of foreign direct investment, openness ratio, foreign trade deficit, inflation and gross domestic product per capita. According to the ADF test results, all variables examined are first order stationary.

Table 3: Bayer-Hanck (2012) Cointegration Test Results

	Engle-Granger	**Johansen**	**Boswijk**	**Banerjee vd**
Test Statistic	-4.4017	39.3788	-2.7975	27.5179
Probability	0.0995	0.0274	0.5434	0.0116
Bayer ve Hanck (2012) Cointegration Test				
Fisher Test Statistic		**Critical Values**		
		%1	**%5**	**%10**
EG-J	11.810 **	15.973	10.532	8.272
EG-J-Ba-Bo-Bdm	21.943**	30.836	20.44	16.086

Not: ** shows %5 level of significance.

According to the cointegration test proposed by Bayer and Hanck (2012), there is a long-term relationship between the series at 5% level of significance.

Table 4: Toda-Yamamoto (1995) Causality Results

Causality Direction	**Prob. Values**
DYY↛DAO	0.6292
DAO↛DYY	0.9232
DYY↛DTA	0.4260
DTA↛DYY	0.9148
DYY⟶KBGSYİH	0.0890*
KBGSYİH↛DYY	0.7707
DYY⟶ENF	0.0718*
ENF↛DYY	0.5763

Not: ***, ** and * shows respectively the significance for %1, %5 and %10 levels.

According to the Toda Yamamoto (1995) Causality test results, there is a causality from foreign direct investments to inflation rate and gross domestic product per capita variables both at %10 level of significance.

4. CONCLUSION

In this study, the relationship between various macroeconomic variables and foreign direct investments in Turkey for the period 1986-2018 has been tested by econometric methods. First of all, stationary of the series tested and ADF test results showed that all the variables have first order stationary. Then, cointegration relation between variables is tested. According to the Bayer and Hanck (2012) cointegration test reveal that there is a long term relation between variables. Lastly, Toda Yamamoto test results assert a causal relation from foreign direct investments to inflation and gross domestic product per capita series.

The GDP variable, which is an indicator of market size, affects FDI. Therefore, we can conclude that the expansion in market size or market volume attracts foreign direct investments. Moreover, there is a significant relationship between the inflation rate, which is a measure of stability (price stability) in the markets, and FDI. An improvement in inflation rates will affect the flow of foreign direct investment into the country.

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CHAPTER 3:

AN EXAMINATION OF THE IMPACT OF THE MILITARY COUP ATTEMPT ON BIST

Asst. Prof. Dr. Filiz GUNEYSU ATASOY[1]

[1] Department of Economics in Osmaniye Korkut Ata University. Osmaniye, Turkey. filizatasoy@osmaniye.edu.tr.

INTRODUCTION

According to Fama's (1965) Market Efficiency Theory; stock prices reflect all available and relevant information such as companies' announcements or annual earnings figures, so it is impossible for investors to outperform by using all available information in a stock market. EMH is divided into three categories. First is the weak form of efficiency which is described as the current stock prices already reflect all information about the market such as the past prices (Bodie, Kane, and Marcus, 2014). Additionally, the past prices *semi-strong form of efficiency* includes all publicly available information and fundamental data. Therefore, according to Khan and Ikram (2010), it is not possible to obtain superior profit by using the fundamental information. The strong form of efficiency presumes that stocks prices display all the available information on a market, such as, historical information, all publicly available information and other private information (Titan, 2015). However, in stock markets, many findings contradict with Fama's Market Efficiency Theory which is called anomaly (violation).

There are plenty of stock market anomalies stated in the literature, such as calendar anomalies, fundamental value anomalies and other anomalies. First, are the calendar anomalies such as the 'Day of the Week effects', 'Holiday Effect', 'January effect (or Monthly Effect)', 'Political cycle Effect' and 'Turn of the Year Effect' (Davidsson, 2006; Abdioğlu ve Degirmenci, 2013). Besides them, there are other stock market anomalies which may not be categorized as both

calendar anomalies and fundamental value anomalies. Some commonly stated other market anomalies are, 'Stock-split Effect', 'Low-prices-stocks effect', 'Earnings Surprise Effect', 'Momentum Effect', 'Insider Transaction Effect', and 'Information Releasing Effect'. To clarify that, brief description of these anomalies and their examples are given in the Table-1. These anomalies conflict with the Fama's Efficient Market Hypothesis, however it is clearly proven for many stock markets in the world as well as for Borsa Istanbul (BIST) in Turkey. The most common ones are *the January Effect (or Monthly), the Day of the Week Effect.* Therefore, the primary purpose of this study is first to investigate the validity of the EMH for BIST. Then, the presence of the January Effect (or monthly effect) and day of the week effect are examined using most current data set. Also, this study specifically examines the impact of military coup attempt in Turkey (15 July 2016). Since the stock markets are fragile depending on stability or credibility of economy and countries' security or safety (Sornette,2017), the coup possibly impacts the stability or efficiency of the market. Thus, the data set is divided into two sections as covering before and after it and the detailed information about the data set and method are given in the following section.

Table-1: Common Anomalies in the Stock Market

Anomalies	Brief Description	Examples
	Calendar Anomalies	
Day Effect	On average, closing price on one day is different in comparison to others. Such as Negative Monday Effect or Positive Friday effect.	Dubois, and Louvet, (1996), Rahman (2009). Güneysu and Yamak (2011) Akbalık and Ozkan (2016)
Holiday effect	Stock returns are generally higher on either Friday or any day before a holiday.	Chong, et, al. (2005). Marrett and Worthington (2009).
January or Monthly Effect	The average returns in January may be higher than others.	Öztürk et al. (2018) Ullah et al. (2016)
Political cycle effect	The anomaly can be seen the first year after the presidential election period.	Santa - Clara and Valkanov (2003)
End of the year effect	At the end of the year the volume of the any kind of trade may be larger than other months.	Givoli and Ovadia (1983)
	Other Anomalies	
Stock-split effect	It may raise the price share of companies either before or after the stock splits are declared	Fama et al. (1997) Yalçın, (2010)
Low-prices-stocks	Fundamentally, earnings drop while sale remains constant for low price stocks.	Guin (2005)
Information releasing effect	If any of investors do not have information, it may cause an adverse selection problem.	Mills and Andrew Coutts (1995)
Late earnings reporter effect	It may arise depending on when firms may announce their earnings.	Guin (2005)
Momentum effect	Momentum effect may arise in a short term or in the intermediate term because of some exceed stocks. According to Guin (2005) study, in this case growth stocks should be chosen.	Lee and Song (2002) Guin (2005)
Insider transaction effect	Insiders are generally well informed; thus, they may earn above average returns.	Lakonishok and Lee (2001)

DATA AND METHOD

For examination of the EMH and the presence of the possible anomalies, BIST-100's daily closed price index is used. The data set are from 01.01.2014 to 01.01.2018. I specifically choose the period to examine how the 15th July 2016 (the attempt to military coup) impact on stock market efficiency. For the analysis of the military coup attempt the data set are divided into 2 periods as before and after of it. Since the stock markets are closed holidays, and weekends, these days are subtracted. As total I have 1010 observation with 2 different data set including before and after periods. The data was obtained from the Central Bank of Turkish Republic[2]'s official web site. First, I calculate the return series by obtaining log differences of daily closing prices of stocks, it provides the data stationary (Miralles-Marcello and Miralles-Quiros, 2002).

$$R_t = ln\frac{(I_t)}{(I_{t-1})} \quad (1)$$

Where R_t is return of continuously compounded daily return of the BIST-100 index on the day t. I_t is closing prices of BIST-100 index on the day t, and I_{t-1} represents on the day of t-1. For examination the possible market anomalies in BIST, namely *the day effect* and *the January effect*, I used the dummy variables Monday through Friday to understand of days fixed effects on BIST price

[2] BIST-30, BIST-50 and BIST-100 data are also publicly available at **https://tr.investing.com/indices/ise-100-historical-data**

index in the regression analysis. If the week of the day is Monday, D1 gets 1, 0 otherwise. If the day is Tuesday, D2 dummies gets 1, 0 otherwise. If the day is Wednesday, D3 gets 1 0 otherwise. If the day is Thursday, D4 gets 1, 0 otherwise, and Friday is chosen as base categories. For the analysis of the January (Monthly Effect) Effect, I also create 11 dummy variables. M1 through the M11 are symbolizing from January to November in sequence, December is chosen as base.

The hypotheses are created for examination of the possible market anomalies as follows,

Hypothesis-1

H0: Daily returns are equal ($\beta_1=\beta_2=\beta_3=\beta_4=\beta_5=0$)

H1: At least one of the daily returns of BIST is statistically different from others.

Hypothesis-2

H0: Average monthly returns are equal ($\beta_1=\beta_{2...}=\beta_{12}=0$)

H1: At least one of the average monthly returns of BIST is different from others.

Then, the Ordinary Least Square is used for examination and following equations are created;

$$R_t = \sum_i \beta_i * D_{i,t} + \varepsilon_t \quad (2)$$

Where β_i symbolizes the regression coefficients, and $D_{i,t}$ are the dummy variable which are created for days or months. For instance, to examine the daily effect and monthly effect the following equations are applied.

$$R_t = \beta_0 + \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 + \beta_4 D_4 + \varepsilon_t \quad (3)$$

$$R_t = \beta_0 + \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 + \beta_4 D_4 + \beta_5 D_5 + \beta_6 D_6 + \beta_7 D_7 + \beta_8 D_8 + \beta_9 D_9 + \beta_{10} D_{10} + \beta_{11} D_{11} + \varepsilon_t \quad (4)$$

To sum up the examination of analysis first, since the dataset contains large number of observations; it can be deviated from normality. Therefore, a transformation is used by taking natural logarithm in equation-1. Then, a regression analysis is applied to evaluate if there is a deviation among mean of (R_t) the daily return (or monthly return). Similar studies in the literature use only regression analysis(Atasoy, 2017; Aslan and Ucar, 2015) but in the current study it is just a step. After that equality of variance is examined. As a last diagnose step, I control independence of observations. When the diagnose finishes, One-way ANOVA is applied. It yields the comparison of more than two groups means. ANOVA is one of the most common methods used in the literature to examine the difference among groups (Kuria and Riro, 2013).

Finally, I apply a multiple comparison which are Bonfferoni, Scheffe and Tukey to understand where the exact differences arises. In other words, the multiple comparison yields to evaluate the differences among each of days' (or months') average return is significant or not. All the examination process is repeated for 3 times for before-after the military coup attempt and all period.

ANALYSIS RESULTS

To examination of the data sets SAS 9.4 program is applied. First of all, the normality assumption was applied that dataset is normal after logarithmic transformation. F value (2.64) is significant at alpha=0,05 and Anderson-Darling test and Cramer-Von Misses for normality's p value are bigger than alpha=0.05 for all data set group. As far as QQ-plot is concern, the residuals fall roughly along the straight line even if there are few outliers, so that normality assumption seems valid. According to Levene's and Bartlett tests of homogeneity of variance is satisfied with p values[3]. Finally, multiple comparison is applied to understand where exactly the difference lies among days. The comparison tests i.e. Bonfferoni, Scheffe and Tukey, all three methods have similar results that only Thursday and Fridays are statistically significant. However, Tukey test is most efficient, because it includes zero more number of times in confidence interval. The results indicated, Friday has a positive (0.0032) while Thursday has a negative impact on stock markets daily returns for all data group.

[3] For brevity of this study, I only report the statistically significant days in comparison analysis.

Table-2: Dependent Variable: lnRt (For all Data Set)

Source	Degree of Freedom	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00104784	0.00026196	2.64	0.0326**
Error	1006	0.09327694	0.00009923		
Corrected Total	1010	0.09432479			

*** and ** symbols show the significance level at %1 and %5, consequently .

Table-3: Tukey's Comparison Results for Day Effect (For all Data Set)

Comparison of Days	Means Differences	Confidence Limits at 95%	
Friday - Thursday	0.003237	0.000432	0.006043***
Thursday - Friday	-0.003237	-0.006043	-0.000432***

Table-4: Bonferroni (Dunn) t Tests for Day Effect (For all Data Set)

Comparison of Days	Means Differences	Confidence Limits at 95%	
Friday - Thursday	0.003229	0.000349	0.006126***
Thursday - Friday	-0.003231	-0.006126	-0.000349***

In the study, the data set also is divided into two subsections to examine the potential anomalies which are the day effect and monthly effect before and after the coup. First, before the coup sub group is examined and the analysis results is given in the Table-5. Since F value (1.87) is not significant at alpha=0,05, the H0 hypothesis cannot be rejected. In other words, there is not any difference in average daily returns among the days. Moreover, the second sub group is examined

and the analysis results is given in the Table-6, and Table-7. According to analysis result, F value is 2.44 and significant at 0,05 alpha. Thus, the H0 hypothesis can be rejected. Then, a comparison test is applied. Tukey comparison results show a positive Friday effect (0,0042) while a negative Thursday effect. There is a positive Wednesday impact while it is very minor (0,00004) and significant at alpha 0.10 level.

Table-5: Dependent Variable: lnRt (for Before the Coup)

Source	Degree of Freedom	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	.00066457	.00016614	1.87	0.1142
Error	634	.04913131	.00008885		
Corrected Total	638	.04979588			

Table-6: Dependent Variable: lnRt (for the After the Coup)

Source	Degree of Freedom	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	.00091695	.00022924	2.44	0.0467
Error	361	.03317757	.00009399		
Corrected Total	364	.03409452			

Table -7: Tukey's Comparison Results- Test for lnRt (for the After the Coup)

Comparison of Days	Means Differences	Confidence Limits at 95%	
Fri - Wed	.000041	.000036	000479*
Fri - Thu	.004275	.000157	.008707***
Wed - Fri	.000041	.000319	.000536*
Thu - Fri	-.004275	-.008707	-.000157***

*** Significant at %1, and * significant at %10.

After the investigation of the day effect, January effect (or monthly) which is one of the most common anomalies is examined. The evaluation process is repeated for all data set and two sub groups. The analysis results for the all data, before and after the coup are presented in the Table-8, Table-9 and Table-10 in sequence. According to analysis results, H0 hypothesis cannot be rejected for all data sets and two sub groups. Thus, there is not any monthly effect in BIST 01.01.2014 and 01.01.2018.

Table-8: Monthly Effect Analysis For all Data Set

Source	Degree of Freedom	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	0.51712573	0.04701143	0.99	0.4512
Error	999	47.18430547	0.04737380		
Corrected Total	1010	47.70143120			

Table-9: Monthly Effect Analysis for Before the Coup

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	.00237718	.00021611	1.22	0.2683
Error	627	.11088506	.00017685		
Corrected Total	638	.11326224			

Table-10: Monthly Effect Analysis for After the Coup

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	0.00138925	0.00013892	1.18	0.3041
Error	353	0.04173674	0.00011790		
Corrected Total	364	0.04312599			

CONCLUSION

This paper empirically determines if the FAMA's EMH is valid for BIST and the presence of potential stock anomalies. The research uses BIST-100 index daily closing prices from 2014 to 2018. The data set specifically chosen to research whether or not EMH valid for current data. Additionally, and more importantly, the potential impact of the military coup attempt is examined. According to Irshad (2017) political uncertainty and insecurity of countries may impact on stock markets. Since the political system is not certain for investors, they may not make any investment to the countries.

The study uses ANOVA and comparison test such as Scheffe and Tukey for analysis of the data set. All analyses are repeated for all data set and two sub-sections. The findings represent that there is a significant day effect in BIST after the military coup period. The highest return is on Friday, while the lowest return is obtained from on Thursday. Positive Friday effect is common because of positive *weekend effect* (2 days). There is also Thursday effect. Besides that, there is a positive Wednesday impact however it is very minor (0,00004) and significant at alpha 0.10 level. In the study, the presence of the monthly effect could not be observed based on the analysis.

All in all, FAMA's EMH which is price shows all the available information is valid during the 2014 to 2018 period. However, a day effect anomaly is observed after the coup period. It means that during the second sub-section FAMA's EMH is not valid in BIST. Bittlingmayer (1992) found that political instability impact on stock

prices volatility. Also, one of the early studies about the countries' political instability emphasize that big event about political instability may negatively lead investors or trader's behavior (Klibanoff, Lamont, and Wizman,1998). Since, the military coup attempt at 15 July 2016 was one of the examples of it and due to economic vulnerability and political instability of the country, some anomalies are observed in the stock market.

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CHAPTER 4:

WHAT IS THE LINK BETWEEN FINANCIAL DEVELOPMENT AND ENERGY CONSUMPTION: EVIDENCE FROM TURKEY'S ECONOMY

Asst. Prof. Dr. Mehmet Levent ERDAS[1]

[1] Akdeniz University, Faculty of Serik Business Management, Department of Economics and Finance, Antalya, Turkey; e-mail: leventerdas@akdeniz.edu.tr

INTRODUCTION

Providing a sustainable economic growth and development is the major economic goal for all of the countries in the world. Besides the basic production inputs such as effort and capital, energy became one of the important factor to accomplish this goal (Apaydin et al. 2019). This is because energy is used to produce almost all kinds of products and services. Accordingly, it plays an important role for the economic developments of the countries.

The energy demand has been growing quickly with the quick increase in population and high life standards in the developing countries where industrialization process has been continuing (Samuel et al., 2013). This kind of increase in the energy demand usually cannot be supplied from the domestic resources. In this case, the developing countries prefer importation since they cannot produce the energy they need (Ersoy, 2010). This is because one of the most important goals of the today's economies is providing growth. One of the most important indicators of the economic growth is exportation. Energy use is also necessary to enable to increase exportation and economic growth, and it causes increase in importation and then high current account deficit. Therefore, it is curricial for the countries which are foreign-dependent in terms of energy consume such as Turkey to gravitate to their own energy resources for their national economies. This is because any kind of volatility on the energy prices in anywhere in the world can cause breakages on those countries' economies as a result of the globalization. Similarly, a volatility on the energy prices makes companies to delay their decisions on

investments and discourages the investments. It affects the growth which is the most important goals of the countries adversely (Brown and Yucel, 2002). Besides, providing the increasing demand for energy from the foreign resources causes the problem of energy shortage and security to be a constant issue (Caliskan, 2009). In this case, those countries which have high energy consumption need to enable the balance of current account and decrease the dependency on the energy importation for a long-term consistent economic structure (Esen and Bayrak, 2017). At this point, renewable energy resources decrease foreign-dependency and they are important in terms of cheap energy production (Bagci, 2019). Additionally, climate change is a growing threat for the humanity. One of the biggest problems threatening lives is the fossil fuels. The countries aiming economic growth need to pay attention to the environment while they try to accomplish their goals. At this point, the renewable energy resources can decrease the countries' needs for fossil fuels and they can substitute fossil fuels (Foster et al. 2017). Within this frame, it is curricial especially for the developing countries to priotarize to utilize their current renewable energy resources.

Nowadays, energy is a key production factor for economic activity in all countries because many production and consumption activities involve energy as a basic input (Zahid, 2008), and that energy saving policy and efficiency improvement will favourably influence the economic growth and climate goals (Matei, 2015). Also, this kind of importance originates from the structural dependency of the energy sector to the other sectors of the economy (Boz et al.

2018). This is because the energy sector is a sector which provides an important amount of input for the other sectors of the economy. Dependently, the energy sector is affected by the developments on the other sectors and also stipulates the development of them (Berberoglu, 1982). Energy, which is one of the building blocks of the economic development, is an essential input necessary to increase the wealth levels of the societies and to use in production (Mucuk and Uysal, 2009). Therefore, the energy input affects the development levels of the countries and it is important to determine the international policies of the countries (Ismic, 2015).

The energy resources can be classified as primary and secondary energy resources in terms of their procurement methods. The primary energy resources are fossil energies originated from animals and plants. Those resources are also called as consumable or conventional energies (Aydin, 2010). Coal, petrol and natural gas are the primary energy resources. The secondary energy resources are electrical, nuclear, solar, geothermal, wind, sea-wave and biomass (wood, turf etc.) energies. Those resources are also called as renewable energy resources (Uslu, 2004). Although a significant part of the increasing demand is met by primary energy sources, the production and the consumption of renewable energy sources have risen over the past decade (Apaydin et al., 2019). Besides, the low cost renewable-related energy resources are now beginning to replace an equivalent amount of fossil fuel in other sectors (Kaberger, 2018).

When the studies in the literature and the energy reports published annually are considered, it can be observed that the majority

of the energy needs are supplied with the fossil fuels. This is because fossil fuels are preferred in several areas since they have a common area of use and they are cost effective. As a result, they predominates the renewable energy resources (Cukurcayir and Sagir, 2008). On the other hand; due to the strict environmental policies and increasing costs, the developed countries supply some amount of their energy needs from the developing countries. Thus, the sector investments creating environmental pollution and increasing energy demands in the developing countries has also been increasing day by day (Cinar and Yilmazer, 2015).

Besides, carbon dioxide (CO2) and similar greenhouse gases originating from the use of fossil fuels such as petrol, natural gas and coal have affected vital activities of the living beings adversely by causing environmental pollution, climate change and global warming (Erdogan and Ganiev, 2016). The international studies related to avoidance from the increasing energy demand and global warming because of fossil fuel use have accelerated the policies which support and increase renewable energy use accepted as cleaner (hydroelectric, geothermal, solar, tide, wind, bio-mass and bio-fuel) (Cinar and Yilmazer, 2015). Since the fossil energy production and consumption have negative impacts on the environment, it caused preferring energy variation to become important as the accessibility of the preferred energy resources (Ugurlu, 2006). Besides; since the underground resources are limited and decreased in a level threatening the society, the renewable energy resources are presented as alternative energy resources (Kulekci, 2009). At this point, the policies such as varying

the current energy resources and making use them with rational methods have been developed. Within this frame, developing investment programs related to renewable energy resources and encouraging the production and consumption of the renewable energy resources are issues which need to be emphasized.

The major advantage of the renewable energy is that they help to protect environment by decreasing carbon dioxide emissions (Erdogan and Ganiev, 2016). Several researches concluded that the consumption of renewable energy has decreased the amount of the greenhouse gas in the nature (Shafiei and Salim, 2014; Boluk and Mert, 2015; Bilgili et al. 2016; Sulaiman et al. 2013; Jebli and Youssef, 2013; Bento and Moutinho, 2016; Dogan and Seker, 2016). Since the renewable energies do not leave pollutive wastes for the environment, they affect the ecology less than the fossil energy technologies. Since there is an energy resource existing in the nature and renewing itself constantly, this type of energy will always exist in the nature (Seker, 2016). On the other hand; since the renewable energy is produced from the domestic resources, it will decrease foreign-dependency. Especially for the sustainable growth and developments of the countries with high foreign-dependencies the renewable energy is crucial (Karagol and Kavaz, 2017). Therefore, the interest for the concept of renewable energy has been increasing in the developed and developing countries (Hwang and Yoo, 2014).

The increase on carbon emission caused by increasing energy demand has made the researches related to the relationship between energy consumption and financial development and between the

carbon emission and financial development which will contribute to developing policies to prevent this problem a current issue.

Financial development means to make the tools used in the financial markets in a country to be more usable commonly by increasing their variety (Oruc and Turgut, 2014; Boz et al. 2018; Basarir and Ercakar, 2017; Caglar and Kubar, 2017). Financial development is really important for the national economies of the countries. Because an efficient financial sector is expected to increase overall economic efficiency, the process of growth and as well as energy consumption (Sadorsky, 2010; Sadorsky, 2011). The effect of financial development on energy consumption subject to the efficiency of the total system, which includes the quality of work, capital, technology, conditions for investment, public policies of the government and institutions (Gomez and Rodriguez, 2019). The concept of financial development is the increase in the diversity of utilized instruments in the financial market in a country and these instruments become more widely used as described (Erim and Turk, 2015; Caglar and Kubar, 2017), and financial development can be defined as the sophistication of financial markets more global in scope (Basarir and Ercakar, 2017). This is because the financial development level can affect the country's economic activity and energy consumption. From this point of view, money and capital markets provide credits for the energy sector by also providing them capital. Similarly, those markets have provided funds for the recently-growıng renewable energy sector. Thus, a good financial development can provide credits for the environmentally-friendly projects with low

financial costs. Besides, financial markets provide credits for the companies to enable them to develop technological products which can help to decrease energy use. Therefore, the financial needs of the companies are supplied and the households' entrepreneurship activities are supported besides the companies. In both cases the funds provided cause the energy demand to increase. Mankiw and Scarth (2008), Sadorsky (2011) Rafindadi and Ozturk (2017) concluded that the financial development has increased the energy development and affected the energy consumption of the developed financial markets in their studies. Therefore, it is possible to think that there is a close relationship between financial development and energy consumption and developed financial markets affect the energy consumption.

The paper aims to examine the relationship between financial development and energy consumption in Turkey. This research performed Hacker and Hatemi-J (2006) bootstrap causality test and Hatemi-J asymmetric causality test (2012) by using time series data to reveal the advantage of Hatemi-J asymmetric causality test which takes into consideration of asymmetric information in financial markets and separates positive and negative shocks. This paper uses yearly time-series data from 1969 to 2015.

The rest of the paper is organized as follows. Section 1 reviews the relevant literature with focus on the relationships between economic growth and energy consumption and financial development and energy consumption. Section 2 describes data structure and empirical methodology. Results are reported in section 3. Conclusion and policy issues are reported in the section 4.

1. Research Background

Recently, two of the most important issues of the contries' national economies are the concept of energy and the sustainability of energy resources. Within this scope, lots of researches are carried out analysing the relationships of the energy consumption with financial and economic variables in the literature. The literature related to financial development, economic growth and fossil and renewable energy consumption is summarized below.

Dan and Lijun (2009) found unidirectional causality running from financial development to energy consumption in China.

Sadorsky (2010) examined the link between financial development and energy consumption in 22 developing countries and found and positive directional significant relationship within these two variables. Sadorsky (2011) found similar results as Sadorsky (2010) in his other study consisting 9 Central and Eastern European frontier economies.

Kakar et al. (2011) found a significant long-run relationship existed between financial development and energy consumption.

Mudakkar et al. (2013) determined that energy consumption, economic growth and financial development in India are important factors affecting FDI.

Shahbaz et al. (2013) analysed the relationship between energy consumption, economic growth, financial development and trade deficit for Chinese economy. They determined that there is bidirectional causality between financial development and energy

consumption and a unidirectional causality from energy consumption to economic growth in their studies.

Coban and Topcu (2013) studied the relationship between financial development and energy consumption for European Union member states (EU27) for the period of 1990-2011. They determined no kind of relationship between financial development and energy consumption in AB27. They concluded that the financial development increases energy consumption in the former members (AB15).

Al-mulali and Lee (2013) analysed the relationship between primary energy consumption, financial development, economic growth, urbanization and total trade in the members of the Gulf Cooperation Council. They concluded that there is a unidirectional positive causality relationship from financial development to energy consumption.

Islam et al. (2013) investigated the relationship between financial development, economic growth and energy consumption. Their findings revealed that financial development and economic growth have positive impact on energy consumption in case of Malaysia.

Le et al. (2014) examined the relationship between financial development, fossil energy consumption and economic growth in the USA. Any kind of short- and long-term relationship related to the effect of financial development on energy consumption.

Zeren and Koc (2014) analysed the energy consumption and financial development with Hatemi-J asymmetric causality test in their study. They determined that the effects of negative and positive

shocks are different in the countries they analysed, that there is a bidirectional causality relationship for Turkey, that the negative shocks of energy consumptions affect financial development and positive shocks of financial development are the causes of energy consumption in Thailand.

Komal and Abbas (2015) studied the relationship between financial development, economic growth and energy consumption for Pakistan. Their findings exhibit a positive relationship between financial development and energy consumption in Pakistan.

Ali et al. (2015) analyzed the financial development and energy consumption nexus for Nigeria applied ARDL bounds testing approach with time series data. The results revealed that financial development has significant negative impact on fossil fuel consumption in case of Nigeria.

Kakar (2016) examined the impact of financial development, energy consumption on the energy consumption. The author found out that there is an existence of long-run causal relationship between financial development, energy consumption and economic growth in Malaysia and Pakistan economies.

Caglar and Kubar (2017) analysed the relationship between financial development, fossil energy consumption and renewable energy consumption in their study on the Turkish economy. They could not determine any kind of causality relationship between financial development and renewable energy consumption. However, they determined that there is a unidirectional causality relationship

between financial developments to fossil energy consumption from financial development to fossil energy consumption.

Cetin and Bakirtas (2018) researched G-7 countries and they found that financial development is one the important factors for the long run demand of environmental friendly energy sources.

Cetin (2018) examined the link between financial development and energy consumption in Turkey and determined a causality running from financial development to energy consumption in Turkey. Dumrul (2018) found same results in his other study for Turkey.

Destek (2018) found the role of banking market development and bond market development have a negative and statistically significant effect on energy consumption. Financial development stimulates clean energy consumptions.

Gomez and Rodriguez (2019) examined the relationship between energy, economic growth, urbanization, and financial development in the country-members of the North American Free Trade Agreement. The results indicate a negative and significant relationship between financial development and energy consumption.

Yue et al. (2019) analyzed 21 transitional countries and observed financial development significant nonlinear impacts on energy consumption. Financial development does have significant nonlinear impacts on energy consumption in transitional countries

Gaies et al. (2019) studied MENA region and determined that the intermediation capacity of the banking system as well as its size is positively and statistically significant affecting to energy use.

Apergis and Payne (2010a) determined in their study where they analysed 20 OECD countries that there is a positive relationship between renewable energy and economic growth. Similarly, Apergis and Payne (2010b) concluded that there is a bidirectional relationship between renewable energy and economic growth in 13 Asian countries. Akay et al. (2015) determined a bidirectional causality relationship between growth and renewable energy.

Positive relationships are generally observed in the studies analysing the relationship between financial development and energy consumption within the literature. However, the direction of this relationship changes based on the development levels of the countries. When the development levels of the counties are high, their financial development levels are also high and their energy consumption is high depending on their increase in wealth (Keskingoz and Inancli, 2016).

2. Methodology

A three-stage process was followed in order to analyse the relationship between financial development and energy consumption in Turkey between 1969 and 2015. At the first stage, conventional unit root tests with breaks are carried out in order to determine the stationarity level of the series and the stationarity conditions of the series are determined. At the second stage, the symmetric causality test developed by Hacker and Hatemi-J (2012) was carried out. At the third stage, the asymmetric causality test brought to the literature by Hatemi-J (2012) was implemented. The symmetric and asymmetric causality tests were explained respectively.

Hacker and Hatemi-J (2006) causality test is based on the causality test developed by Toda and Yamamoto (1995). Hacker and Hatemi-J (2006) developed this new causality test by using a bootstrap simulation method. The Toda and Yamamoto (1995) test was created according to the assumption that the errors have a normal distribution. When the error term does not have a normal distribution or have an ARCH structure, it was claimed that this test can cause incorrect results (Hacker and Hatemi-J, 2006). Hacker and Hatemi-J (2006) suggested that the test performance is weak when the chi-squared distribution is used with the small examples. Similarly, Hacker & Hatemi-J proved that it will have more effective results in the analyses with small observations where the number of observation is 50 or around 50 by producing critical values which are in conformity with the series by using bootstrap techniques (Hacker and Hatemi-J, 2006). Therefore, Hacker and Hatemi-J (2006) suggested the bootstrap distribution instead of asymptotic $\chi 2$ distribution used by Toda and Yamamoto (1995). Thus, bootstrap simulation techniques are used to achieve critical values in the causality test. Besides, since the analysis method of Hacker and Hatemi-J (2006) is based on Toda and Yamamoto's (1995) MWALID test, the fact that the existence of cointegration between the series of the analysis is not requisite and is not sensitive to the series to be stationary in different degrees provides more reliable results. Additionally, this method also considers the different sizes of samples, integration degrees and variance condition changing in the error term process autoregressive conditional heteroscedasticity, ARCH (Hacker and Hatemi-J, 2006).

The VAR ($p+d_{max}$) process for the series subjected to the analysis like it happened in the Toda and Yamamoto test is estimated as follows:

$$y_t = v + A_1 y_{t-1} + A_p y_{t-p} + ... + A_{p+d} y_{t-(p+d)} + \mu_t \quad (1)$$

Where, y_t k indicates the vector of the item description variables, v indicates the constant vector and A indicates parameter matrix. p indicates the number of VAR lags and d_{max} indicates the maximum integration degree. The maximum integration degree is determined by considering the stationarity levels of the variables. It is necessary to determine the stationarity levels of the series in the model and the lag length of the model correctly before implementing the causality test suggested by Hacker and Hatemi-J (2006). VAR is the optimal lag length (p) of the model and the biggest stationarity degree (d_{max}) of the analysed variables. In the model where the bootstrap causality is tested, an additional lag is added in the degree where the stationarity of the series are provided.

Var ($p+d_{max}$) model can be summarized as follows:

$$Y = DZ + \delta \quad (2)$$

After determining the p and d_{max} values, the null hypothesis of Granger causality through VAR ($p+d_{max}$) model will be as follows:

$$H_0 : C\beta = 0 \quad (3)$$

The null hypothesis can be tested with the following Wald Test method:

$$MWald = (C\beta)' \left[C\left((Z'Z)' \otimes S_u \right) C' \right]^{-1} (C\beta) \sim \chi^2_p \quad (4)$$

where, $\beta=vec(d)$ and *vec* indicates column sorter, $\otimes$ indicates Kronecker factor, C indicates $px n(1+n(p+d))$ matrix and S_u indicates variance co-variance matrix of the error term.

The Toda-Yamamoto causality test (1995) is implemented in order to determine the causality between the variables in the Hacker and Hatemi-J (2006) bootstrap granger causality test; however, the critical values are obtained with the Monte Carlo simulation against the risk that the errors do not have the possible normal distribution (Cevik and Zeren, 2014). Hacker and Hatemi-J (2006) mentioned the possible changing variance problem in analysis and they indicated that this problem can be eliminated by using bootstrap method for the critical values (Hacker and Hatemi-J, 2006). Due to all of the abovementioned reasons, it is possible to say that this method is ascendant compared to the other symmetrical causality tests. However, the deficiency of the Hacker and Hatemi-J (2006) test is that it cannot distinguish the positive and negative shocks, in other words, it accepts the effects of the positive and negative shocks on the series as equal. In other words, the shocks are approached as symmetric without distinguishing them as positive and negative ones in all of the mentioned causality tests (Kaya et al., 2016). However, it needs to be considered that the dynamic relationship between the series in the researches in the literature can be different or the investors in the markets can give different reactions to the positive and negative shocks. Therefore, it was indicated that the symmetric causality tests can fail to detect those relationships. When the former studies are analysed, it can be observed that the effects of the positive and

negative shocks are different especially in the financial data and there are lots of studies which reveal the existence of the asymmetric information in the financial data. From this point of view, the asymmetric causality test suggested by Hatemi-J (2012) and enabling to research the top-down and bottom-up causality relationship between the variables was also implemented in the study.

Hatemi-J (2012) developed the asymmetric causality test from the asymmetric decomposition method firstly used by Granger and Yoon. In the study where Hatemi-J (2012) analysed the asymmetric causality the causality analysis was applied to the variables by distinguishing them to positive and negative components. The distribution of the components will be performed within the scope of the random walk procedure as follows (Hatemi-J, 2012):

It is assumed that there are two series as y_{1t} and y_{2t} in order to reveal the asymmetric causality relation between two integrated series:

$$y_{1t} = y_{1t-1} + \varepsilon_{1t} = y_{1,0} + \sum_{i=1}^{t} \varepsilon_{1i} \quad t = 1, 2, ..., T \tag{5}$$

$$y_{2t} = y_{2t-1} + \varepsilon_{2t} = y_{2,0} + \sum_{i=1}^{t} \varepsilon_{2i} \quad t = 1, 2, ..., T \tag{6}$$

Where, t=1,2,…T; $y_{1,0}$ and $y_{2,0}$ represent initial values. In addition, the error terms ε_{1i} and ε_{2i} are determined as white noise residuals. In this regard, the positive and negative shocks are presented as follows, respectively:

$$\varepsilon_{1i}^{+} = \max(\varepsilon_{1i}, 0),\ \varepsilon_{2i}^{+} = \max(\varepsilon_{2i}, 0),\ \varepsilon_{1i}^{-} = \min(\varepsilon_{1i}, 0),\ \varepsilon_{2i}^{-} = \min(\varepsilon_{2i}, 0) \tag{7}$$

Therefore, residuals can be stated as a sum of the positive and negative shocks as $\varepsilon_{1i} = \varepsilon_{1i}^{+} + \varepsilon_{1i}^{-}$, and $\varepsilon_{2i} = \varepsilon_{2i}^{+} + \varepsilon_{2i}^{-}$. With the information assumption, it is possible to express the equations for a $y_{1,0}$ and $y_{2,0}$ as follows:

$$y_{1t} = y_{1t-1} + \varepsilon_{1t} = y_{1,0} + \sum_{i=1}^{t} \varepsilon_{1i}^{+} + \sum_{i=1}^{t} \varepsilon_{1i}^{-} \tag{8}$$

and similarly;

$$y_{2t} = y_{2t-1} + \varepsilon_{2t} = y_{2,0} + \sum_{i=1}^{t} \varepsilon_{2i}^{+} + \sum_{i=1}^{t} \varepsilon_{2i}^{-} \tag{9}$$

Finally, the positive and negative shocks which take part in each variable can be expressed as an equation in cumulative form as follows:

$$y_{1t}^{+} = \sum_{i=1}^{t} \varepsilon_{1i}^{+}, y_{1t}^{-} = \sum_{i=1}^{t} \varepsilon_{1i}^{-}, y_{2t}^{+} = \sum_{i=1}^{t} \varepsilon_{2i}^{+}, y_{2t}^{-} = \sum_{i=1}^{t} \varepsilon_{2i}^{-} \tag{10}$$

Within this frame, the Hatemi-J (2012) asymmetric causality test is the version of Hacker and Hatemi-J (2006) test where the positive and negative shocks are distinguished.

3. Data and Results

In this study investigating causality relationship between energy consumption and financial development, annual data in period of 1969-2015 for Turkey. Each variable involve the period 1969-2015 and consists of 49 observations in total. Since there is no data published related to the variables after 2015, it is possible to analyse this period. Energy consumption is included by the analysis as two different variables as renewable and fossil fuel by being distinguished in the study. Distinguishing the energy consumption is performed

based on the study of Caglar and Kubar (2017). The banking sector development index is constructed with utilizing deposit money bank assets to GDP, private credit to GDP, financial system deposit to GDP, liquid liabilities to GDP and private credit by deposit money banks to GDP. For this purpose, as the financial development indicators; the variables of financial system deposits to GDP, private credit to GDP, and liquid liabilities to GDP are employed. These variable has been used in numerous studies including Beck et al. (2001), Sadorsky (2010), Sadorsky (2011), Coban and Topcu (2013), Zeren and Koc (2014), Ali et al. (2015), Caglar and Kubar (2017), Basarir and Ercakar (2017), Cetin (2018), Destek (2018). Following series are used in this paper in order to test the hypotheses, where the financial system deposits to GDP (FSD), deposit money bank assets to GDP (PC), liquid liabilities to GDP (LL), fossil energy consumption (FOS), renewable energy consumption (RNW). The all data were obtained from World Development Indicators (2016) of World Bank database. All of the series has been measured by natural logarithms of values. Data used in this paper consist of average yearly. The DF-GLS as a standard unit root tests was applied by using Eviews 10.0 software package; Zivot and Andrews (1992), Lee and Strazicich (2003) as a the unit root tests with the breaks, Hacker and Hatemi-J (2006) bootstrap causality and Hatemi-J (2012) asymmetric causality test were applied by using Gauss 10.0 software package.

Information about the statistical values of the data is provided before causality analysis. Those statistical values explain the relationships and characteristics of the series and help the selection of

the model to be established by providing information. Table 1 shows descriptive statistics that has been applied to determine the nature of the data.

Table 1: Descriptive Statistics of the Series

	FSD	PC	LL	FOS	RNW
Mean	25.80393	20.91309	26.94812	891.3534	124.2623
Median	23.04640	16.28600	22.24570	844.0423	128.7833
Maximum	46.03420	61.63480	44.54960	1619.310	180.0370
Minimum	10.97160	11.35890	15.07860	337.1741	37.49295
Std. Dev.	10.03136	12.63871	8.952619	364.8439	46.06952
Skewness	0.752776	2.049915	0.790055	0.360637	-0.398451
Kurtois	2.464474	6.120755	2.177048	2.013453	1.770657
Jar. Bera	5.000552	51.98928	6.215748	2.924792	4.203243
Prob.	0.082062*	0.000000***	0.044696**	0.231680	0.122258

Source: Author's compilation and values obtained from Eviews.
Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. *, ** and *** denote the series are not normally distributed.

Table 1 presents mean, median, maximum, minimum, standard deviation, skewness, Kurtois and Jarque Bera of the series. The average, median and standard deviation values of the indicators of financial development were founded to be close to each other. The average values of the indicators of financial development are really close to the median values. Besides, the fact that the obliquity values are distant from zero and the kurtosis values are distant from three indicates that the series do not have a normal distribution. When the statistics of the Jarque-Bera (JB) test which was performed to resolve that the variables have a normal distribution, the H_o hypothesis was accepted for three financial developments and it was observed that the series do not have a normal distribution in 1%, 5% and 10% of significance level. Besides, the average, median and standard deviation values of the energy consumption variables are founded to

be distant from each other. It was observed that fossil fuel energy consumption in Turkey is more common than renewable energy consumption and the volatility of fossil energy consumption is higher than the volatility of renewable energy. The obliquity and kurtosis values of both of the energy consumption series indicate that those series have a normal distribution. Additionally; when the Jarque-Bera (JB) test statistic is considered, it was observed that the series have a normal distribution when the Ho hypothesis is rejected. The progress of the data of financial development and energy consumption indicators for the mentioned period is indicated in Figure 1.

Figure 1. Time-Series Plots of Series

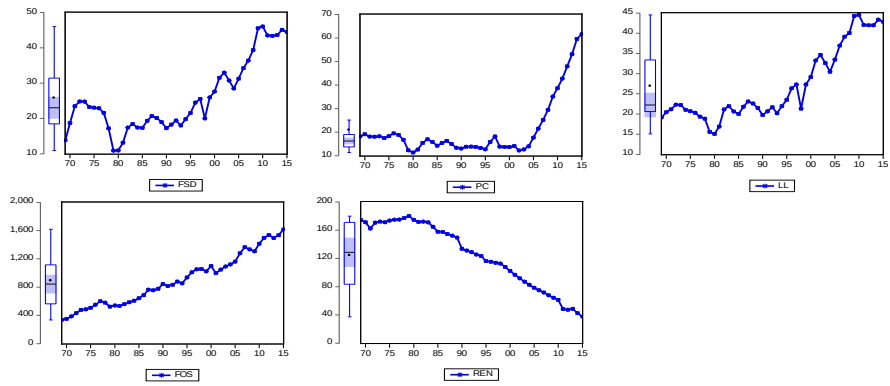

Figure 1 displays the graph from 1968 to 2016 for financial development indicators and energy consumption. It can be observed that; although some structural formations occur in the mentioned period; all series expect for renewable energy consumption have exhibited an increasing trend continuously. It can be also observed that there were some structural changes (breaks) in all of the series between 1969 and 2015.

The DF-GLS unit root test, Zivot and Andrews (1992) and Lee and Strazicich (2013) unit root tests from one break unit root tests were used firstly to determine the stationarity levels of the variables. Table 2 presents the results of the DF-GLS unit root test for the series for levels and the first differences of the natural log values both intercept and trend and intercept models.

Table 2: The results of Unit Root Test

Series	DF-GLS			
	Intercept		Trend & Intercept	
	Level	1st difference	Level	1st difference
FSD	-0.391300	-3.197012*	-2.964317	-4.131393*
PC	-0.369743	-4.160400*	-1.256138	-5.004595*
LL	-0.118586	-5.985412*	-2.032267	-6.127693*
FOS	1.292542	-6.143117*	-2.456987	-6.286611*
RNW	0.025741	-1.972990**	0.061731	-7.543630*

Source: Author (Eviews).

Notes: The unit root test for the DF-GLS were obtained by applying the Schwarz information criteria. For the spectral estimation method Bartlett Kernel was determined and for the Newey-West method Bandwidth options were used. Schwarz information criteria (SIC) were selected for automatic lag selection. DF-GLS Elliott-Rothenberg-Stock: -3.48 (%1 level), -2.89 (%5 level), and -2.57 (%10 level).

As can be seen in table 2, the null hypothesis could not be rejected on the level values for the financial development and energy consumption series. The results of the DF-GLS unit root test indicate that the series of financial development and energy consumption become stationary at the first differences in the models with intercept terms and in the models with intercept and trend when the first difference is taken of the series. According to those results, the financial development indicators and energy consumption series are

not stationary at the level values and they become stationary after their differences are taken.

After the stationarity of the series was analysed with the DF-GLS unit root test which is one of the conventional unit root tests, the unit root test with structural break was performed. When the results of the unit root test where a model with constants is used, it can be observed that both series are stationary and the null hypothesis cannot be rejected. When the first differences are taken, it can be observed that the series become the first differences with unit roots and the alternative hypothesis is accepted.

Table 3 reports the results of the Zivot and Andrews (1992) and Lee and Strazicich (2013) unit root tests for the series for intercept model (Model A).

Table 3: The Results of Unit Root Tests with Structural One Break

Zivot and Andrews (1992) ADF Test		
Series	**Model A (Intercept)**	**Breakpoint**
FSD	-4.539	1988
PC	-2.512	2003
LL	-3.807	2003
FOS	-4.246	1984
RNW	-1.696	2008
Lee and Strazicich (2013) LM Test		
FSD	-3.107	1999
PC	-1.917	1997
LL	-3.150	1998
FOS	-3.175	2000
RNW	-1.052	1978

Source: Author (Gauss).

Notes: The critical values for the Zivot-Andrews test: Model A: -5.34, -4.80 and -4.58 at the 1%, 5% and %10 levels, respectively. The critical values for the Lee-Strazicich test: Model A: -4.239, -3.566 and -3.211 at the 1%, 5% and %10 levels, respectively.

According to the results of the both unit root tests, the null hypothesis cannot be rejected for the financial development and energy consumption and it was determined that the integration degree of the series is one. The maximum integration degrees of all series are determined as 1. After the maximum stationarity levels of the series were determined, a level in the amount which a stationarity of the series is provided was added to the model. The results of the Hacker and Hatemi-J (2006) causality analysis carried out by using the ($p+d_{max}$) values of the series are presented in Table 4.

Table 4: Results of Hacker and Hatemi (2006) Causality Test (Fossil Energy)

Null Hypothesis	MWALD Test Statistic	($p+d_{max}$)	Bootstrap Critical Values			Decision
			%1	%5	%10	
FSD ≠> FOS	11.992*	2	7.245	4.117	2.862	H_0: Accept
FOS ≠> FSD	0.030		7.635	4.151	2.888	H_0: Refuse
PC ≠> FOS	4.540	3	10.947	6.781	5.161	H_0: Refuse
FOS ≠> PC	3.266		11.674	6.949	5.161	H_0: Refuse
LL ≠> FOS	14.732*	4	13.498	8.620	6.775	H_0: Accept
FOS ≠> LL	2.025		13.319	8.579	6.660	H_0: Refuse

Source: Author (Gauss).
Note: *, ** and *** denote statistical significance at the %1, %5 and %10 level of significance, respectively. The bootstrap p-values are, in each case, based on 10,000 replications. Optimal lag length was selected using AIC (Akaike information criterion).

The results of the Hacker and Hatemi-J (2006) test where the causality relationship between the fossil development indicators and fossil energy consumption is analysed are reported in Table 4. According to the Hacker and Hatemi-J (2006) bootstrap causality test results, except the causality relationships from financial system deposits to fossil energy consumption and from liquidity debts to

fossil energy consumption, the MWALD test statistics were lower than the critical values obtained through bootstrap method for all the other. It was determined that the MWALD test statistic of the financial system deposits and fossil energy consumption is 11.992, the bootstrap critical values at the 1%, 5% and 10% reliance levels are 7.245, 4.117 and 2.862 respectively. It was observed that the MWALT test statistic of the liquidity debts and fossil energy consumption series is 14.732, the bootstrap critical values at the 1%, 5% and 10% reliance levels are 13.498, 8.620 and 6.775 respectively. Since the MWALD test statistics in both of the causality relationship are higher than the bootstrap critical values, the basic hypothesis was rejected. Therefore, causality relationships from financial system deposits to fossil energy consumption, from liquidity debts to fossil energy consumption were determined. While the null hypotheses where there is no causality from private sector credits to fossil energy consumption in Turkey were accepted, the null hypotheses where there is no causality from financial system deposits and liquidity debts to fossil energy consumption are rejected. From this point of view, it can be observed that the credits provided for private sector are not a reason for fossil energy consumption. On the other hand; when the result of the causality is analysed, a relationship from financial system deposits and liquidity debts which are two of the financial development indicators to the energy consumption at the 1% significance level is determined and no kind of causality with the opposite direction was determined. When the results given in Table 4 are evaluated, it is possible to talk about a relationship between financial development and fossil energy

consumption in Turkey and it was observed that this relationship is from financial development to fossil energy consumption. The findings suggest that fossil energy consumption is influenced by financial development indicators. These results are consistent with the results of Shahbaz and Lean (2012), Coban and Topcu (2013), Islam et al. (2013), Shahbaz et al. (2013), Pradhan (2017), Gungor and Simon (2017), Caglar and Kubar (2017), Malik and Mansur (2017), Kurt (2019), Yue et al. (2019).

Table 5: Results of Hacker and Hatemi (2006) Causality Test (Renewable Energy)

Null Hypothesis	MWALD Test Statistic	$(p+d_{max})$	Bootstrap Critical Values			Decision
			%1	%5	%10	
FSD≠>REN	0.413	4	14.946	9.212	7.014	H_0: Refuse
REN≠>FSD	1.189		15.111	9.574	7.342	H_0: Refuse
PC≠>REN	1.732	4	14.674	9.084	6.986	H_0: Refuse
REN≠>PC	0.548		15.224	9.535	7.374	H_0: Refuse
LL≠>REN	0.361	4	14.124	9.078	6.946	H_0: Refuse
REN≠>LL	2.746		13.399	8.837	6.812	H_0: Refuse

Source: Author (Gauss).

Note: ≠> denotes non Granger causality. The optimal lags in VAR(p) model was determined based on AIC and SIC. The bootstrap critical values were calculated based on 10,000 replications. *, ** and *** denote statistical significance at the %1, %5 and %10 level of significance, respectively

The test results of the Hacker and Hatemi-J (2006) test where the causality relationship between the financial development indicators and renewable energy consumptions are reported in Table 5. In this case, the main hypothesis indicating that there is no kind of causality relationship between energy consumption and financial development indicators cannot be rejected. This is because; the MWALD test statistics calculated are lower than the critical values obtained through bootstrap method. The results concluded that

mobility on the financial development indicators in Turkey does not affect the renewable energy consumption. When the other side of the causality is analysed, it was observed that there is no kind of causality from renewable energy consumption to financial development indicators. It indicates that the condition of renewable energy consumption will not affect financial development indicators. Therefore, any kind of causality relationship was not detected from financial development indicators to renewable energy consumption or from renewable energy consumption to financial development indicators. This result is consistent with the studies of Muibi and Omojo (2015), Burakov and Freidin (2017), Caglar and Kubar (2017). According to those results, it is more suitable to use the Hatemi-J (2012) asymmetric causality test which is one of the more developed tests whether there is a relationship between financial development and energy consumption and which distributes the series as negative and positive shocks. Therefore, the analysis continues with the research on the asymmetric causality relationship between energy consumption and financial development indicators.

Whether the relationship between financial development indicators, fossil-related energy consumption and renewable energy consumption differs according to the positive and negative shocks was analysed through the Hatemi-J (2012) asymmetric causality test and the results are presented in Table 6 and Table 7.

Table 6: The Results of Hatemi-J (2012) Asymmetric Causality Test (Fossil Energy)

Null Hypothesis	MWALD Test Statistic	Bootstrap Critical Values			Null Hypothesis	MWALD Test Value	Bootstrap Critical Values		
		%1	%5	%10			%1	%5	%10
$FSD^{+} \neq> FOS^{+}$	10.340*	7.433	4.204	2.874	$FOS^{+} \neq> FSD^{+}$	0.011	7.332	4.220	2.914
$FSD^{+} \neq> FOS^{-}$	0.333	7.294	4.182	2.860	$FOS^{+} \neq> FSD^{-}$	0.442	8.569	4.261	2.839
$FSD^{-} \neq> FOS^{-}$	5.026**	13.759	5.140	2.834	$FOS^{-} \neq> FSD^{-}$	0.073	12.500	4.379	2.587
$FSD^{-} \neq> FOS^{+}$	3.319	7.087	4.048	2.870	$FOS^{-} \neq> FSD^{+}$	0.090	8.935	4.142	2.703
$PC^{+} \neq> FOS^{+}$	4.885	11.224	6.986	5.127	$FOS^{+} \neq> PC^{+}$	1.422	10.899	6.878	5.212
$PC^{+} \neq> FOS^{-}$	4.143	9.819	6.202	4.843	$FOS^{+} \neq> PC^{-}$	0.946	11.878	7.005	5.133
$PC^{-} \neq> FOS^{-}$	0.882	18.462	8.788	5.896	$FOS^{-} \neq> PC^{-}$	5.067	16.904	7.745	5.125
$PC^{-} \neq> FOS^{+}$	1.924	10.416	6.527	5.003	$FOS^{-} \neq> PC^{+}$	2.652	13.655	7.493	5.307
$LL^{+} \neq> FOS^{+}$	14.469*	13.866	9.055	7.067	$FOS^{+} \neq> LL^{+}$	0.569	13.354	8.902	6.887
$LL^{+} \neq> FOS^{-}$	3.466	14.172	9.197	7.069	$FOS^{+} \neq> LL^{-}$	6.773	16.482	9.603	7.035
$LL^{-} \neq> FOS^{-}$	12.344***	24.799	13.463	9.250	$FOS^{-} \neq> LL^{-}$	0.317	18.745	9.833	7.085
$LL^{-} \neq> FOS^{+}$	3.959	13.800	8.672	6.744	$FOS^{-} \neq> LL^{+}$	4.944	14.694	8.963	6.887

Source: Author (Gauss).

Note: $\neq>$ implies non Granger causality. The optimal lags in VAR(p) model was determined based on AIC and SIC. The bootstrap critical values were calculated based on 10,000 replications. *, ** and *** denote statistical significance at the %1, %5 and %10 level of significance, respectively.

As can be seen in Table 6; according to the results of the Hatemi-J (2012) test which researches the causality relationship between the cumulative positive and negative changes of financial development and energy series; it was observed that in terms of positive shocks, there is a significant asymmetric causality relationship from the positive shocks of financial system deposits (FSD) to the positive shocks of fossil energy consumption (FOS) at the 1% significance level; there is a significant asymmetric causality relationship from the positive shocks of liquidity debts to the positive shocks of fossil energy consumption (FOS) at the 1% significance level; there is a significant asymmetric causality relationship from the negative shocks of liquidity debts to the negative shocks of fossil energy consumption (FOS) at the 10% significance level. Additionally, no kind of asymmetric causality relationship was observed from private sector credits (PC) to fossil energy consumption (FOS) or fossil energy consumption (FOS) to private sector credits. This is because the MWALD statistical values obtained at the 1%, 5% and 10% significance levels are lower than the bootstrap critical values in terms of all shocks. Therefore, there is no kind of relationship between financial development and fossil energy consumption. Those results indicate that the positive changes on financial development cause an increase on fossil energy consumption and negative changes on financial development cause a decrease on fossil energy consumption. It can cause the financial development level to increase, the electric demand to increase since it affects the real sector and consumer income, and energy demand to increase

since it causes people to prefer vehicles consuming more energy. The underdevelopment of financial markets can cause decrease on energy demands. On the other hand; even the results indicate that financial development affects energy consumption positively; its effects on the environment, human health and sustainable development should be considered. The findings of this research are consistent with previous studies, such as Mankiw and Scarth (2008), Sadorsky (2010), Sardosky (2011), Shahbaz and Lean (2012), Ozturk and Acaravci (2013), Zeren and Koc (2014), Komal and Abbas (2015), Gungor and Simon (2017) Caglar and Kubar (2017), Yue et al. (2019), Gaies et al. (2019), Senan et al. (2019). It seems that financial development indicators can positively/negatively effect on fossil energy consumption in Turkey.

Table 7: The Results of Hatemi-J (2012) Asymmetric Causality Test (Renewable Energy)

Null Hypothesis	MWALD Test Statistic	Bootstrap Critical Values			Null Hypothesis	MWALD Test Value	Bootstrap Critical Values		
		%1	%5	%10			%1	%5	%10
$FSD^{+} \neq > REN^{+}$	2.817	18.147	10.289	7.268	$REN^{+} \neq > FSD^{+}$	2.676	17.155	10.257	7.566
$FSD^{+} \neq > REN^{-}$	0.267	22.221	11.367	7.939	$REN^{+} \neq > FSD^{-}$	1.866	15.981	9.723	7.258
$FSD^{-} \neq > REN^{-}$	0.503	20.040	10.424	7.448	$REN^{-} \neq > FSD^{-}$	0.585	18.751	10.017	7.254
$FSD^{-} \neq > REN^{+}$	0.528	24.283	11.554	7.812	$REN^{-} \neq > FSD^{+}$	1.575	14.764	9.148	6.989
$PC^{+} \neq > REN^{+}$	0.237	16.586	9.939	7.403	$REN^{+} \neq > PC^{+}$	2.839	15.807	9.442	7.171
$PC^{+} \neq > REN^{-}$	0.319	22.434	11.604	7.988	$REN^{+} \neq > PC^{-}$	0.493	14.440	9.228	7.196
$PC^{-} \neq > REN^{-}$	1.167	18.837	10.175	7.358	$REN^{-} \neq > PC^{-}$	0.899	18.016	9.752	7.236
$PC^{-} \neq > REN^{+}$	0.686	24.032	11.616	7.614	$REN^{-} \neq > PC^{+}$	5.863	14.535	9.024	6.888
$LL^{+} \neq > REN^{+}$	3.050	20.208	10.469	7.403	$REN^{+} \neq > LL^{+}$	2.027	18.524	10.308	7.672
$LL^{+} \neq > REN^{-}$	0.842	23.490	11.319	7.663	$REN^{+} \neq > LL^{-}$	0.842	16.506	9.982	7.322
$LL^{-} \neq > REN^{-}$	0.167	20.612	10.689	7.550	$REN^{-} \neq > LL^{-}$	1.655	19.401	10.165	7.163
$LL^{-} \neq > REN^{+}$	0.832	27.981	12.123	7.937	$REN^{-} \neq > LL^{+}$	1.705	15.849	9.391	7.053

Source: Author (Gauss).

Note: $\neq >$ denotes non Granger causality. The optimal lags in VAR(p) model was determined based on AIC. The bootstrap critical values were calculated based on 10,000 replications.

As can be seen in Table 7; according to the results of the Hatemi-J (2012) asymmetric causality test the MWALD test statistics are lower than the bootstrap critical values at the 1%, 5% and 10% of significance levels. The null hypothesis indicating that the positive (negative) shocks for the financial development indicators are the Granger cause of the positive (negative) shocks for the renewable energy consumption could not be rejected. According to those results, any kind of causality relationship from the financial development indicators to renewable energy consumption in terms of positive and negative shocks was not detected. The same result is detected for the reverse relationship. Those results indicate that the condition of the financial development will not affect renewable energy consumption and the condition of renewable energy consumption will not affect the financial development indicators. It seems that financial development indicators can any effect on renewable energy consumption in Turkey. These findings support the Caglar and Kubar (2017).

From those results, it was observed that both Hacker and Hatemi-J (2006) symmetric and Hatemi-J (2012) asymmetric test results are consistent. The results of both causality tests revealed that there are symmetrical and asymmetrical causality relationships between the financial development indicators and fossil energy consumption. Besides, it was determined that there is no kind of symmetric or asymmetric relationship between the financial development indicators and renewable energy consumption. As a result, the Hacker and Hatemi-J (2006) and Hatemi-J (2012) asymmetric causality tests indicated that the changes on the financial

development indicators affect energy consumption, however, they do not affect renewable energy consumption.

4. Conclusion and Policy Implications

Energy is an important input for the economic growth and when the energy consumption increases, the production also increases and as a result, the economy enters into a quick growth process. The increasing population, social development and quick development of the industrial sector especially in the developing countries such as Turkey, the energy demand also increases. Majority of the energy needs in those countries are supplied with the fossil energy resources. Intense industrialization activities cause the energy demand to increase when compared to the other countries and it causes dependency on importation. For the Turkish national economy which is foreign-dependent, the energy consumption is an increasing factor for the current account deficit. Besides, even the energy consumption increasing as a result of the industrialization is a desirable condition, its effects on the human health and sustainable development should be considered. Fossil energy consumption causes greenhouse gas emissions to the nature and climate changes, thus it threatens the humanity. The negative environmental conditions caused by fossil energy resources have increased the countries seek for alternative energy resources. The essential remarkable issue related to energy use is on renewable energy use. Within this frame, the policymakers face with the issue of production and consumption of renewable energy as an important agenda both politically and theoretically.

The study analysed the relationship between financial development and energy consumption in the period 1969-2015 in Turkish economy with the symmetrical and asymmetrical causality approaches. Three different variables are used from the financial development indicators: financial system deposits/gross domestic product, private sector credits/ gross domestic product and liquidity debts/gross domestic product. Two different variables are used from the energy consumption indicators: fossil energy consumption and renewable energy consumption. Hacker and Hatemi-J (2006) test results indicated that there is a causality relationship between financial development and fossil energy consumption, and this causality relationship is a unidirectional from financial development to energy consumption. The Hatemi-J (2012) test results indicated that any kind of increase or decrease on financial development will cause an increase or decrease on energy fossil energy consumption. In other words, there is a linear relationship between financial development and fossil energy consumption. Those results indicate that financial development affects fossil energy consumption, and therefore, it has an important impact on predicting the changes on carbon emissions to the nature. On the other hand, any kind of symmetric and asymmetric relationship between the financial development indicators and renewable energy consumption is detected. Consequently, the results prove that financial development affects fossil energy consumption in Turkey. Therefore, it is possible to observe the financial development indicators have important effects on fossil energy consumption. With those results; since financial development affects fossil energy consumption, it is expected that financial development can be used as

an efficient policy tool for fighting with global warming and climate change.

The relationship between energy consumption and financial development is an issue analysed especially for the developing countries. It is possible to say that revealing the direction and degree of the relationship between energy consumption and financial development is efficient for addressing the energy policies. From this point of view, it is necessary to consider the environmental effects of increasing energy demands and the governments need to prepare policy suggestions in order to decrease fossil fuel use.

Turkey is a country which has quite wide resources both in geographical and physical terms for renewable energy. There is an increase on the use of renewable energy such as other countries. However, it is not the desired level. It is primarily necessary for Turkey to use the current fossil energy resources more efficiently and enable the renewable energy resources. It is necessary to develop policies to increase the use of renewable energy resources for the countries which are foreign-dependent in terms of energy. The policymakers, the government, industry sector and the financial institutions have crucial roles to decrease the use of fossil resources which threaten humanity because of their greenhouse gasses emissions, to minimize foreign-dependency in order to close the current account deficit in terms of energy, and to encourage the investments on renewable energy resources. Therefore, it is important to develop policies related to encouraging the renewable energy resources in order to decrease foreign-dependency and provide consistency in growing.

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CHAPTER 5:

ECONOMETRIC ANALYSIS OF MIGRATION-INFORMAL EMPLOYMENT RELATIONS IN TURKEY

Ceren PEHLİVAN[1]

Rabia EFEOĞLU[2]

[1] PhD Student, Inonu University, Malatya, Turkey, pehlivanceren23@hotmail.com
[2] Research Assistant, Nıgde Omer Halisdemir University, International Trade and Logistics Management, Nığde, Turkey, rabia.efeoglu@ohu.edu.tr

1. INTRODUCTION

Informal employment has been handled in many ways by many researchers. In its most common definition, it is defined as employment activity outside the sovereignty of the state. The lack of an effective method to measure the dimensions of informal employment due to its nature increases the importance of studies on this subject in economic terms. The most important reasons of informal employment, which is one of the leading social and financial problems of developing countries, are socio-economic phenomena such as population growth, migration, income distribution, unemployment, inflation and changes in economic structure. In addition, the inability of the state to establish an effective financial system is the determining factor in the emergence of this phenomenon. The phenomenon that can be met normally for a certain period of time as an unusual and temporary type of employment has become a structural employment problem in our country. The resolution of the problem will not depend on the administrative and police measures to be taken, but will depend on the social and economic measures taken (Güloğlu et al., 2003: 52).

Informal employment has an important place in total employment, especially in developing countries. Developments in developing countries lead to the emergence of poverty and new poverty on the basis of urbanization, migration and population growth and changing demographic structure. In addition, globalization and structural changes in production and labor force have adversely affected the employment of the world and thus chronic the

unemployment problem. This situation facilitated informal work and led to its spread (Silk, 2014: 167).

In Turkey where is in the category of developing countries, informal employment is intensively monitored. Especially after the 1980s, it can be said that the immigration from villages to cities has an effect on informal employment. During the 20-year period up to the 2000s, informal employment has been at a high rate of 60%. Recent developments in Syria have increased the economic effectiveness of the phenomenon of migration (Akgeyik et al., 2004: 25).

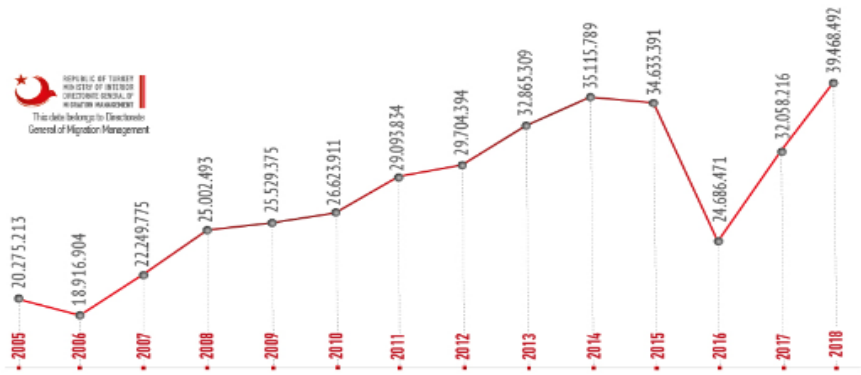
Migrations from villages to cities have been experienced in industrialized societies as a result of the transformations in the economy with globalization. The new situation brought high unemployment rates in cities. In the analyzes related to the subject, it has been concluded that the forms of employment created by globalization, the spread of different aspects of production on a global scale, the expansion of subcontracting, subcontracting system and flexible work, increased informal and low wage work (Silk, 2014: 181).

Migration is a phenomenon of displacement due to the right to live or to meet the most basic needs and to have better living conditions. Social, economic, demographic, political and security problems occur due to reasons such as people leave their living areas and move to new living spaces (Cengiz, 2015: 106).

In a critical position in international immigration (Asia, Africa, and at the intersection of Europe) located in Turkey, it is a destination

country for migrants. It is also an important transit country for entering Greece, Serbia and Hungary (Yasım, 2019: 3). The fact that our country, which has geopolitical importance, is an intersection country and the policies it has followed in the recent period has led to an increase in the number of immigrants. In Figure 1 this is shown in detail:

Figure 1. Entrance to Turkey by Years



Source: Repuclic of Turkey Ministry of Interior Directorate General of Mıgration Management

Figure 1 shows the number of inflows to Turkey between 2005-2018. The graph, which followed an upward trend until 2015, fell in 2016 and increased again in the last two years.

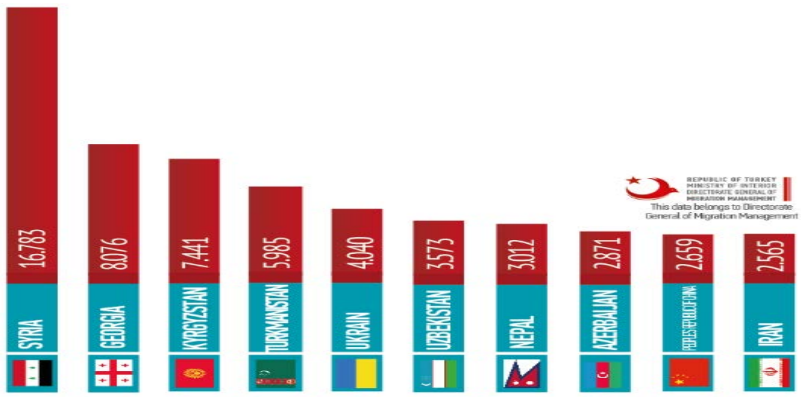
Figure 2. E-Residence (million people)

18 MAY - 31 DECEMBER (2015)	253.128
TOTAL (2016)	490.799
TOTAL (2017)	588.521
TOTAL (2018)	722.932
18 MAY 2015 – 26 SEPTEMBER 2019	3.173.733

Source: Repuclic of Turkey Ministry of Interior Directorate General of Mıgration Management

Following the recent developments in Syria, there has been a significant increase in the number of foreigners residing in our country. This number reached 3 million people in 2019.

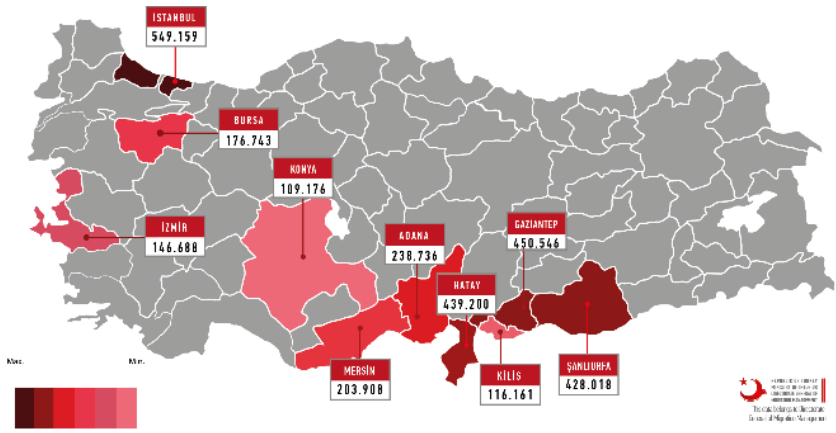
Figure 3. Foreigners Those Who Have Been in Turkey With a Work Permit in 2018 (Top Ten Countries)



Source: Repuclic of Turkey Ministry of Interior Directorate General of Mıgration Management

Syria ranks first. This country is followed by Georgia with 8076 and Kyrgyzstan with 7,441. It is seen that most of the migrations coming to our country come from the nearby geography.

Figure 4. Distribution of Syrians Under Temporary Protection by Top 10 Provinces



Source: Repuclic of Turkey Ministry of Interior Directorate General of Mıgration Management

Istanbul is one of the places where Syrians under temporary protection remain in our country. In the border regions, the number of remaining immigrants is quite high. In particular, the total number of refugees in Gaziantep, Şanlıurfa and Hatay exceeds 1 million.

Turkey which it is located in the heart of the destination and transit country for international migration, mobility, in the 1950s, "labor migration" has come from that country. In 2015, it became the country with the largest refugee population in the world (Aygül, 2018: 69). The new situation started to affect the labor market

negatively. The low wages of the labor force, the increase in the unemployed caused the working population to shift to informality.

Labor market in Turkey where is widespread informal employment, irregular migrant labor is easier than domestic labor for substituted. This situation is considered as an economic supportive effect on economic growth. However, it is unlikely that unequal growth based on cheap or informal employment will be sustainable (Eder and Özkul, 2016: 4).

Emigration to our country and the fact that most of the migrants have a late population brought about the employment problem. The fact that we have a young population as a country and the increase in immigration has caused many economic and social problems such as unemployment, inflation, income inequality and housing. In the study, the relationship between the increase in informality in the economy due to the increase in migration is examined. The relationship between migration and informal employment is examined econometric. Firstly, verbal and numerical information on the subject is given. Then, literature review is made and econometric results are given in the last section.

2. LITERATURE REVIEW

The phenomenon of immigration has created a wide field of investigation due to the recent political crises in neighboring countries. The concept of migration is discussed with different variables. The social effects of employment and economic growth were also investigated.

In 2002, Abadan-Unat examined the relationship between concepts in the economic system. In this study, economic developments in Japan, Western Europe and North America increased the countries' presence in the world market. He emphasized that this situation will increase the migration from the surrounding regions to commercialized countries and the economies of the country will be affected negatively by the developments.

Filiztekin and Gökhan (2008) investigated what is the main determinant of migration within the country. In their study for a period of 10 years, they have reached conclusions proving the theories that see migration as an investment in human resources. They concluded that there are economic factors such as unemployment, income inequality and educational status on migration.

Erçevik (2013), has conducted the study analyzed only by addressing Turkey. The study examined the development of migration movements in 2000. As a result of the analysis, 6 Log - Linear Models were created for area receiving migration and 6 Log - Linear Models created for migratory regions and it is questioned the economic efficiency of migration.

Ortega and Peri (2009) investigated which variables affect the total employment data. Only 14 of the OECD countries were used in the study. As a result of the analysis, it was concluded that per capita output does not directly affect the internal flow of migrants, as migration shocks increase total employment and production proportionally. In this study, the inclusion of immigrant human

capital and diversity of source countries negatively affected the results.

Brücker and Schröder (2011) investigated the relationship between the co-integration of the immigrant flow and immigrant stocks for Germany during the period 1967-2009. As a result of the analysis, there is a cointegration relationship between migration stocks and explanatory variables (GDP per capita, employment rate, delayed migrant stocks).

Boubtane et al. (2013) investigated the relationship between migration, unemployment and growth using the Panel VAR model. Between 1987 and 2009, he conducted research for 22 OECD countries. They concluded that migration flows positively contributed to GDP per capita in the host country and negatively affected the total unemployment rate of the host country.

Gunay et al. (2017) examined the phenomenon of migration in two aspects. They showed that there was population growth and distorted urbanization in the receiving countries. In addition, they concluded that the unemployment rate increased due to the informal employment of immigrants.

Tunç (2015) examined the effect of migration on social behavior. Studies on the effects of the social structure of Syrian refugees Turkey, studied under two headings as opportunities and threats. As a result of the SWOT analysis, it was noted that the increase in unemployment rate due to Syrian employment has the power to adversely affect the labor market in the coming years. He

stated that the phenomenon of unemployment put forward may return to the economy as informality.

Çatalbaş ve Yarar (2015), have focused on the causes of internal migration in Turkey in 2008-2012. In their panel analysis, they used variables such as inflation rate, employment rate, terrorism problem and wealth level of the region. They emphasized that migration would have negative effects on employment, inflation rate and deteriorate economic efficiency.

Göv and Dürrü (2017) examined the relationship between migration and economic efficiency for the 7 OECD countries they selected. Annual data were used for the period 2000-2016. Employment rate and economic growth rate were included in the analysis. They concluded that there was a one-way relationship between variables.

Altunç et al. (2017) examined the impact of migration on unemployment, inflation and economic growth. In this study, time series analysis was performed and data for 1985-2015 were used. As a result of the causality test conducted between migration and employment, it was found that there was no relationship.

3. METHODOLOGY AND DATA SET

The study was conducted using time series method to investigate the relationship between migration and informal employment. Data are provided by TUIK, OECD, World Bank, T.C. The Undersecretariat of Treasury of the Prime Ministry, UNHCR and

the remaining data were taken from the related studies. Annual data covering the period 1990-2018 were used. The total number of unregistered migration rates and employment data used in the study for Turkey. Logarithmic values of related variables were taken and analysis was started. Then, the level of stagnation of the series was tested. Augmented Dickey Fuller and Phillps Perron unit root tests were used for stationary analysis. As a result of the stationarity test, since the variables were integrated at the same level, cointegration analysis was performed. After cointegration analysis, short term effect of the variables was analyzed and error correction model and equation were formed. In the last part, the relationship between the variables is examined with causality test.

Table 1. Descriptive Statistics

Variables	Mean	Std. Dev.	Skewness	Kurtosis	Jarque- Bera
lnMGRTN	10.780	0.773	0.300	2.593	0.637
lnEMPLY	9.145	0.142	-0.005	1.959	1.307

NOTE: If the skewness value is <0; left skew, If the skew value> 0; to the right. If the kurtosis value is <3; flat, if the kurtosis value is> 3; It is steep.

The standard deviation value indicates the degree of volatility of the variables. This value was higher for migration data. The skewness value represents the asymmetric distribution for the variables used. Migration data is skewed to the right, while informal employment data is skewed to the left. The kurtosis value indicates the tail distribution between the variables. In both variables, the flattening coefficient was flattened.

The Dickey Fuller test is a test that is used to examine whether the time series contains unit roots in statistics. In applications performed on series, it is necessary to perform ADF test in order to determine whether the series carries unit root or not.

The PP test, which was developed to check the high degree of correlation that does not include limiting assumptions about error terms, is a unit root test complementary to the ADF test. Delayed values of dependent variables sufficient to eliminate autocorrelation in the PP test are not included in the model. Instead it is adapted with the Newey-West estimator. In this test, it is concluded that the series is stationary if the test statistic is greater than the critical values tabulated by Mac Kinnon as an absolute value (Altunç, 2008: 118).

Table 2. ADF and PP Results

		I(0)		
Variables	ADF	Probability	PP	Probability
lnMGRTN	-1.223	0.647	0.490	0.878
lnEMPLY	-1.740	0.400	-1.650	0.444
		I(1)		
lnMGRTN	-7.601	0.000***	-3.729	0.009***
lnEMPLY	-5.461	0.000***	-5.682	0.000***

NOTE: *** indicate significance level of 1%.

Stability of the variables was tested by unit root analysis. The lag length of the variables that became stationary in I (1) was found to be 2. The cointegration test was conducted to examine the long-term relationship between migration and informal employment data.

In order to ensure the stability of the variables in the analysis of the series, taking the differences can cause loss of relationship

between the variables and high values. The cointegration test is an analysis examining whether there is a long-term relationship between variables in stationary series. The long-term relationship between the variables is a concurrent model structure and shows integrity within itself (Tarı and Bıdırlı, 2009: 8).

Table 3. Trace Test

Hypotheses	Trace	Critical (%5)	Probability
None*	21.700	18.397	0.016***
At Most 1	7.818	3.841	0.005***

NOTE: *** indicate significance level of 1%.

The presence of long-term relationship between the two variables used in the study was proved by the trace test. The probability value was lower than 5%. In addition, the trace test value was greater than the critical value.

After the analysis showed that there was co-integration between the variables, the Error Correction Model (VECM) was estimated. There is a long-term equilibrium assumption between variables. However, in the short term there will be deviations from this long-term balance. Error Correction Model is applied to determine how long time deviations will disappear (Gujarati and Porter, 2012: 764).

The error correction coefficient obtained from the error correction equation is expected to be negative and take values between 0 and -1. If the error correction coefficient is less than 1, the system is balanced, and the negative sign indicates that there is movement back to the equilibrium in case of deviation from the

equilibrium. In other words, the error correction mechanism works (Bozkurt, 2007: 166).

Table 4. Error Correction Result and Equation

Error Correction	D(lnMGRTN)	D(lnEMPLY)
Coefficient	-0.173	-0.056
Standard error	0.109	0.032
t-Value	-1.581	-1.748

According to the results, approximately 0.173 of the deviations that occur in the migration data in a short time disappear. So these deviations 1 / | ECM | = 1 / | -0,173 | reach the long-term balance in a period of approximately 5 periods.

The equation is constructed as follows:

$$\Delta \ln \mathrm{MGRTN}_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i} \Delta \ln \mathrm{EMPLY}_{t-i} + \sum_{i=1}^{r} \beta_{2i} \Delta \mathrm{MGRTN}_{t-i} + \psi_1 + \mu_{2t} \quad (1)$$

After the cointegration tests, FMOLS-DOLS tests are applied to the variables to test the consistency of the estimators within our expectations in order to estimate the final non-deviant coefficients of this relationship. The coefficients of the variables serve to determine the strength of the connection with each other (Kök et al., 2010: 8).

Table 5. FMOLS-DOLS Results

FMOLS			DOLS	
Variable	Coefficient	Probability	Coefficient	Probability
lnEMPLY	3.058	0.054	2.360	0.015

As a result of FMOLS-DOLS analysis, the coefficient was positive in both tests. Increases in the number of migrations lead to an increase in informal employment. The results support the theory.

The Toda Yamamoto causality test is a test that allows the investigation of the causality relationship between both stationary values at the level values and stationary at the first difference values. At the application stage of the test, it is first necessary to know the maximum degree of integration (dmax) of the series calculated by the VAR method. The delay level determined by the VAR model is then added to the integrated level (dmax) of the variable with the highest integration. Finally, p + dmax delay is estimated by the Least Squares method on the original values of the series (Toda and Yamamoto, 1995: 225).

Table 6. Causality Results

Hypotheses	Optimal Delay Length (k+ dmax)	Wald ($\chi 2$)	Probability
lnMGRTN≠>lnEMPLY	2	3.745	0.081*
lnEMPLY≠>lnMGRTN	2	1.478	0.147

Note: *, indicate significance level of 10%.

As a result of causality analysis, an increase in migration will lead to an increase in employment. In addition, this situation will lead to an increase in informality when the economy cannot be met. The analysis shows that there is a one-way link to informal employment from migration.

3. CONCLUSION

Migration is a concept with different dimensions and reasons. This situation brings with it many problems for the receiving countries. Human migration leads to many problems in economic life. Each migration brings with it a qualified / unskilled labor force. It imposes responsibility on countries in many areas such as health, education, housing and food in the economy. In the social sense, adaptation problems are experienced due to the characteristics of both immigrant and immigrant country. Although it occurs as a result of different reasons, migration is a broad concept with economic, social and political dimensions.

In this study, the economic aspect of this multidimensional concept is tried to be examined. The relationship between the two cases was analyzed econometricly with the data set which was created using the total number of migrations and the number of informal employment. Descriptive statistics, unit root, long-term relationship and causality link of variables were examined with time series method. It was found that there is a bond between each other. The findings of the survey, the wave of immigration in recent period, Turkey will prepare the labor market has proved a team environment to experience problems. It was determined that these problems would be economic problems such as increasing unemployment, decreasing wages and increasing informal employment. It is seen that unequal growth based on cheap and informal employment cannot be a sustainable policy in the economy.

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CHAPTER 6:

THE DETERMINANTS OF NET ERRORS AND OMISSIONS: THE CASE OF TURKEY

Assist. Prof. Omer Faruk BICEN[1]

[1] Balikesir University, Faculty of Economics and Administrative Sciences, Economics, Balikesir, Turkey, ofbicen@balikesir.edu.tr

INTRODUCTION

The balance of payments is an economic table showing the net result of foreign currency flows arising as a result of economic activities undertaken by residents of one country in a certain period with residents of other countries. Foreign exchange flows can indirectly be the counterparts of goods and services movements, as well as directly against capital movements. Today, foreign investments, portfolio investments and other short-term capital flows can move freely from one country to another depending on the lifting of restrictions among countries.

The two basic accounts of the balance of payments are the current account and the capital account. In addition to these two basic accounts, there are also a reserve account and a net error and omission account which will lead to the imbalances caused by these two basic accounts. These two accounts are more likely working to provide the balance in the balance of payments.

The basic feature of the balance of payments is that, in all international transactions, the records are made double-sided as credit and debt. This is called double-entry bookkeeping (Krugman and Obstfeld, 2003: 309). Due to double-sided registration, in the balance of payments, foreign exchange inflows and outflows necessarily arise in a provision of transaction. In practice, however, the balancing of the balance of payments is recognized through the net errors and omissions account operating in the balancing direction.

With differentiation from country to country, net errors and omissions accounts generally result in differences in the results of compilation, measurement and timing resulting from the different sources of data on transactions that result in action in the balance of payments (Blomberg, Fross and Karlsson, 2003: 43-44; The CBRT Balance Sheets Report, 2011: 22). Zhang (2015: 218) refers to the net errors and omissions as an item reflecting statistical errors and capital outflows, which are not as noticeable as current accounts or capital accounts. According to Lin and Wang (2009: 1); net errors and omissions can show unidentified hot money movements.

According to the IMF; net errors and omissions account for more than 5% of gross merchandise trade is high (Fausten and Brooks, 1996: 1305; Tang, 2006: 8). It is important that countries carefully follow the changes that occur in the net error and omission accounts, whether due to scheduling, measuring and compiling related errors or hot money inflows. Such capital inflows and outflows have the potential to cause macroeconomic instability for the countries, if the size of the net errors and omissions account is attributable to unrecognized hot money movements. However, the size of the net errors and omissions account is also related to the quality of the balance of payments statistics (Blomberg, Fross and Karlsson, 2003: 45). Countries in general can not pinpoint the factors leading to net errors and omissions. But, the high quality of statistics produced or obtained by countries will increase the consistency of the estimates on which the net errors and omissions account size is based.

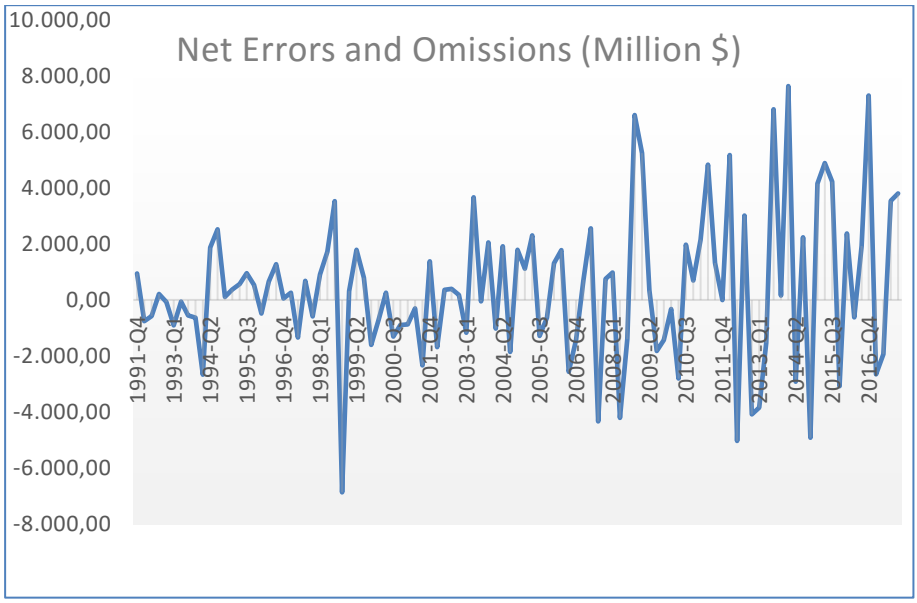
The main purpose of the study is to investigate the size of the net errors and omission account and also to try determining the factors affecting net errors and omissions for Turkish economy between 2006 and 2017. In this context, the study consists of four parts, including the introduction section. Second section following the introduction section focuses on the development and causes of net errors and omissions account in Turkey. In the third section, the results of previous studies on the subject are summarized. In the fourth and last section, the data set and the empirical model are introduced at first, then the relationship between net errors and omissions account and considered variables will affect the net errors and omissions account in Turkey are examined moving from The Balance of Payments Reports published by the Central Bank of the Republic of Turkey and studies in the literature.

1.The Development and The Causes of Net Errors and Omissions Account in Turkey

Turkey, which is among the world's twenty largest economies, is a country with the socio-political importance in the region. It has enjoyed rapid growth thanks to the liberal policies implemented since the 1980s. However, when the periods of rapid growth are examined, intensive capital inflows seem to contribute to these periods of rapid growth. Especially, Turkey that lived in the speculative hot money inflows since the 1990s has also experienced a severe financial crisis due to the sudden reversal in hot money. The crises that took place in

1994, 1998 and 2001 were crises that emerged due to the outflows of hot money.

Figure 1. The Development of Net Errors and Omissions Account in Turkey (1991Q4-2017Q3 - US $ Million)



Source: The CBRT, Electronic Data Delivery System, https://evds2.tcmb.gov.tr, Accessed: 26.12.2017.

As Lin and Wang (2009: 1) pointed out earlier, net errors and omissions can also indicate unidentified hot money movements. According to another study the reasons that led to net errors and omissions in Turkey are goods movements and payments in foreign trade occured at different times, misstatements in customs transactions and questionnaires on some data (Çıplak, 2005: 1; Özekicioğlu and Taştan, 2013: 133-134). Whatever the source, to reveal the factors that determine the net errors and omissions account for Turkey is a necessity for macroeconomic stability.

The quarterly data of the net errors and omissions account for Turkey, the Central Bank of the Republic of Turkey is provided continuously by the Electronic Data Delivery System since the fourth quarter of 1991. The development of net errors and omissions account is shown in Figure 1 in Turkey. In the 1990s, except for the fourth quarter of 1998, the net errors and omissions was less fluctuating. However, from 2003 onwards, it has been observed that upside and downside fluctuations in the net errors and omissions have increased, and even with the 2008 Crisis these fluctuations have become more severe. For this reason, it is important to determine the factors that cause this.

When the World Bank data are analyzed, Turkey, with net errors and omissions account size is about 11.2 billion dollars, ranks sixth in the world after Japan (84.6 billion dollars), the US (74 billion dollars), Italy (26.2 billion dollars), Norway (24.7 billion dollars) and Switzerland (15.6 billion dollars) on an annual basis as of 2016. In this period, countries with negative net errors and omissions account are China (-222.7 billion dollars), Saudi Arabia (-58.4 billion dollars) and Sweden (-31.8 billion dollars) respectively (World Bank, 2017).

Especially, The Balance of Payments Reports published by the Central Bank of the Republic of Turkey analyzed the factors that cause the net errors and omissions in Turkey in places. In relation to this, it is more emphasized on the foreign currency deposit accounts opened by persons who are resident in Turkey and on the deposits held by domestic residents abroad (The CBRT, Balance Sheets Report 2011Q2-2012Q1). Determinants of foreign exchange deposits are

expenditures made in foreign currency by foreigners, the foreign currency accounts that open by the resident citizens of the Republic of Turkey abroad, when visiting to Turkey and the foreign currencies excluded from the financial system are included in the banking system with applications such as TL (Turkish Lira) depreciation and financial amnesty. The most important example for this situation is the increase in foreign exchange deposits by approximately $ 15.8 billion in the January-September period of 2015 compared to the end of 2014. The depreciation of the TL in this period has led to the foreign exchange deposits of foreign countries being brought to the country (The CBRT, Balance Sheets Report 2015Q3). Accordingly, in the first three quarters of 2015 net errors and omissions account in Turkey has given a positive balance of about $ 13 billion.

Foreign deposits movements of domestic residents can be monitored for 46 countries through the Bank of International Settlements (The CBRT, Balance Sheets Report 2016Q4). According to the Balance of Payments Reports, the decline occurring in deposits abroad has been reflected as an increase to Turkey's net errors and omissions account. The increase in foreign deposits, on the other hand, leads to a net balance and a negative balance. Particularly with the amendment made in the Decree No. 32 on the Protection of the Value of the Turkish Money on 8 February 2008, the obligation to convert the foreign currency that had got after exportation by citizens of the Republic of Turkey to Turkish Lira by bringing the country has been removed. As a result, deposits held by domestic residents abroad increased by the amount (The CBRT, Balance Sheets Report

2013Q1). In connection with this situation, in May, June and July, net errors and account had a serious negative balance. After the global crisis started, the Law No. 5811 issued on November 22, 2008 initiated "asset peace" in order to bring some foreign assets to the economy. Even though there has been a decrease in the level of foreign deposits together with the application of asset peace, increase in deposits abroad again during periods of favorable economic trends in Turkey occurred.

2010 is regarded as a period of recovery after the global crisis period. During this period, as in the first half of 2008, there was a period in which domestic residents increased their foreign assets and net errors and omissions accounted for a negative balance. For example, in the first quarter of 2013, in the last 12 months, the reason for the net errors and omission to be -8.5 billion was the increment in foreign deposits. The applications such as change in Decree No. 32, global crisis and asset peace have exacerbated fluctuations in net errors and omissions since 2008 (The CBRT, Balance Sheets Report 2015Q3). As will be noted in the Balance Sheet Reports; the foreign deposits show an increase and the net error and omission account gives a negative balance when accelerating economic growth, interest rates fall and TL gained value against foreign currencies in Turkey. But, the net error and omission account gives a positive balance when decelerating economic growth, interest rates increase and TL depreciate value against foreign currencies in Turkey.

2.Literature Review

In literature, with regard to determinants of net errors and omissions and related macroeconomic variables, there are a number of studies that studied by Tang (2006), Lin ve Wang (2009), Tang (2013), Alagöz (2014), Çoban and Özel (2014), Zhang (2015) and Siranova and Tiruneh (2015).

First of all, Tang (2006), in the study that he has done, has investigated the relationship between balancing item and openness in the 1977q2 – 2002q4 periods for Japan economy. According to the Vector Autoregression (VAR) analysis results; openness significantly affects the balancing item with 5, 6 and 9 periods delayed.

Lin and Wang (2009), in their study, have investigated the factors that affected the net errors and omissions using quaterly data in the 1981q1 – 2007q4 periods for Norway, Sweden, Philippines and South Africa. The most important reason for the selection of these countries in the study was the fact that the size of the net error and omission account exceeds the criterion of the IMF. As stated earlier, the IMF states that net errors and omissions are high if the net error and omissions account exceeds 5% of gross merchandise trade. According to the results; trade openness in Norway, seasonality in Sweden, seasonality, Exchange rate, the difference between the US interest rate and the local interest rate, trade openness and money supply in South Africa affected the net errors and omissions. In the Philippine economy, however, no significant relationship was found between variables.

Tang (2013), in his study, has examined the factors that affected the net errors and omissions for Australia economy between 1960-2010 years. The results reached have showed that real gross domestic product, foreign demand, foreign interest rate, domestic interest rate and foreign exchange rate directly or indirectly affected the net errors and omissions.

Alagöz (2014), in the study that he has done, has examined the relationship between economic growth and the net errors and omissions for Turkey economics in the framework of 2002q2 - 2012q4 periods. The results have showed that there was a one-way causality relation from the net error and omission to the growth in the related period.

Çoban and Özel (2014), in the study that analyzed between the net errors and omissions and exportation for Turkey economics in the framework of 2005m1 – 2012m12 periods, have reached the result that there was no causality relationships between two variables in the relevant period.

Zhang (2015), in his study that has examined short-term capital movements based on net errors and omissions in China economy for 1994-2004 periods, has reached the result that the net errors and omissions was weakly correlated with the yuan (RMB) / dollar rate, and was strongly related to GDP growth rate.

Finally Siranova and Tiruneh (2015), in their study, have focused on the development of the net errors and omission calculation in the Slovakian economy during the period 2008-2014. According to the results obtained; there was no relationship among exchange rate,

unobservable hot money movements and unrecorded trade and net errors and omissions.

3.Data Set, Model and Ampirical Analysis

In this study which examines the determinations of the net errors and omissions account in Turkey, it is used monthly data for the series covering the period 2006M1-2017M9. In the process of determining model and variables to work, it is focused on the studies that studied by Alagöz (2014), Tang (2013), Zhang (2015) and on "The Balance of Payments Reports" published by The Central Bank of The Republic of Turkey. Data set was also formed via The Central Bank of The Republic of Turkey Electronic Data Delivery System database. The variables used in the study and the explanations and sources of these variables are given in Table 1.

Table 1. Variables Used in the Study

Variable	**Explanation**	**Source**
NEOM	The Net Errors and Omissions (Million $)	The CBRT, Electronic Data Delivery System, https://evds2.tcmb.gov.tr, Accessed: 04.12.2017.
FEA	Foreign Exchange Deposit Account (Million $)*	
GDP	Industrial Production Index**	
RER	Real Effective Exchange Rate Based on Consumer Price Index	
INT	Weighted Average Interest Rates Applied To Deposits Up To One-Year TL in Banks	

* The original version is TL denominated and converted to US Dollars at the monthly average selling rate.
** Since the GDP data were published quarterly, the monthly industrial production index was used.

The relationship among the variables in Table 1 is examined in the frame of the model shown by the following equation 1.

$$NEOM_t = \alpha_1 + \alpha_2 FEA_t + \alpha_3 GDP_t + \alpha_4 RER_t + \alpha_5 INT_t + \mu_t \quad (1)$$

The net errors and omissions variable (NEOM) in equation 1 is the dependent variable of the model. The Foreign Exchange Deposit Account (FEA), Industrial Production Index (GDP), Real Effective Exchange Rate (RER) and Interest Rate (INT) are independent variables of the model. In the econometric analyzes EViews 7 and Stata 14 package programs were used.

The scope of the econometric analysis is the determination of the long-run relationship (cointegration relation) and causality among the series in equation 1. Prior to analyzing the cointegration and causality relationship, the stability of the series has been examined.

3.1.Stationary Analysis

Examining the long-run relationships between the series in econometric analyzes, the stationary of the series is an important issue in avoiding the problem of "spurious regression". If the series are not stationary, a spurious regression problem may arise. In this case, the R^2 is high and the t-statistics are meaningful. But the estimates obtained are meaningless in terms of economic implications (Granger and Newbold, 1974: 117). In determining the stability of econometric time series, unit root tests are widely used. In practice, in addition to Dickey-Fuller (DF), Augmented Dickey-Fuller (ADF) unit root tests, ADF-GLS unit root test, KPSS (Kwiatkowski-Phillips-Schmidt-Shin) unit root test, Phillips-Perron (PP) unit root test and Ng-Perron unit

root test are also used. This type of unit root tests does not take into account the structural breaks that may occur in the series. Unless structural breaks are taken into account, reliability of the results are reduced in terms of economic outcomes. Structural breaks in the series can generally take place as a result of changes in economic policies and structural changes (Sevüktekin and Nargeleçekenler, 2010: 399). In particular, there is a high probability that the series are structurally broken due to the 2008 Global Financial Crisis during the analyzed period.

Unit root tests with structural breaks are also divided into tests in which the breaking time is known and the breaking time is unknown. The tests developed by Zivot and Andrews (1992) and Perron (1997) are tests in which the breaking time is not known in advance and allow single structural breaks, while Perron (1989) test is a test where only one break is found and breaking time is known.

In this study, the stationary of the series are examined by means of Zivot and Andrews (1992) unit root test with structural break in which the breaking time is not known and allow single structural breaks.

Zivot and Andrews (1992: 28) developed the following unit root tests to detect breaks in the series in their work.

Model A:

$$y_t = \mu^A + \Theta^A DU_t(\lambda) + B^A t + \propto^A y_{t-1} + \sum_{j=1}^{k} c_j^A \Delta y_{t-j} + e_t \quad (2)$$

Model B:

$$y_t = \mu^B + \gamma^B DT_t^*(\lambda) + B^B t + \propto^B y_{t-1} + \sum_{j=1}^{k} c_j^B \Delta y_{t-j} + e_t \quad (3)$$

Model C:

$$y_t = \mu^C + \theta^C DU_t(\lambda) + B^c t + \gamma^C DT_t^*(\lambda) + \propto^C y_{t-1} + \sum_{j=1}^{k} c_j^C \Delta y_{t-j} + e_t \quad (4)$$

The equations expressed as Model A, Model B and Model C show structural break in the intercept, structural break in the trend and structural break in the intercept and trend, respectively. As the break date is not known, each period is determined as possible break period and dummy variables are used. When Tλ is considered as the breaking year in the determination of the break, in the Model A, $DU_t(\lambda)$=1 if Tλ <t. In other cases, $DU_t(\lambda)$=0. In the Model B, $DT^*_t(\lambda)$=t-Tλ if Tλ<t. In other cases, $DT^*_t(\lambda)$=0. Due to the Model C is the combination of Model A and Model B, a similar process is followed. After this application for the whole period is done, the period with the minimum t statistic value of α coefficient is determined as the probable break period. The null hypothesis that the series contains the unit root together with the structural break is rejected. If the absolute value of the obtained t statistic is higher than the critical value of Zivot and

Andrews (1992). In the opposite case, the null hypothesis is accepted (Zivot and Andrews, 1992: 29).

Table 2. Zivot and Andrews (1992) Unit Root Test with Structural Breaks Results

Variables	Structural Break in the Intercept (Model A)		Structural Break in the Intercept and Trend (Model C)	
	t Statistics	Break Period	t Statistics	Break Period
NEOM	-10,2106 (0)*	2012M04	-10,1872 (0)*	2013M7
FEA	-4,1439 (3)	2013M7	-4,2081 (3)	2013M7
GDP	-3,8969 (5)	2008M8	-3,9019 (5)	2010M3
RER	-3,5225 (4)	2009M10	-3,9501 (4)	2008M9
INT	-6,6173 (4)*	2009M1	-6,5178 (4)*	2009M1

Note: 1- Values in parentheses indicate the appropriate lag length.
2- According to the Zivot and Andrews (1992: 30-31), for the Model A, % 1 critical value is -5,34, for the Model C, % 1 critical value is -5,57.
3- * indicates significance at the level of 1%.

Table 2 shows the results of the Zivot and Andrews (1992) unit root test for whether dependent and independent variables previously discussed in the study are stationary. When the results obtained are examined; only the net errors and omissions variable (NEOM) and the interest rate (INT) variable exceed the critical values in the Zivot and Andrews (1992: 30-31) as an absolute value. Accordingly, there are structural breaks in the related series, but the series have not the unit root. Besides, since the t statistic values of the Foreign Exchange Deposits Account (FEA), Industrial Production Index (GDP), Real Effective Exchange Rate (RER) series are below the critical value as an absolute value, these series have the unit root.

3.2.Cointegration Analysis

Although there are different methods in the literature that reveal the long-term cointegration between the series, there are points where each one is superior and weak against each other. In practice, cointegration methods developed by Engle and Granger (1987), Johansen (1988), Johansen and Juselius (1990) and Peseran, Smith and Shin (2001) are available. However, these methods do not consider the parameter changes or structural breaks that may occur in the long term in the cointegration equation. For this reason, in the study, Gregory and Hansen (1996) cointegration method, which considers possible parameter changes and structural breaks in the long run, has been used.

In their work, Gregory and Hansen (1996: 102-103) have developed a cointegration method that determines the breaking time in the cointegrated vector and permits a single structural break in the model. The method is similar to the method developed by Engle and Granger (1987), but this method additionally investigates structural break.

Model 1:

$$y_{1t} = \mu + \alpha^T y_{2t} + e_t \qquad t = 1,.....,n. \qquad (5)$$

Model 2:

$$y_{1t} = \mu_1 + \mu_2 \varphi_{t\tau} + \alpha^T y_{2t} + e_t \qquad t = 1,.....,n. \qquad (6)$$

Model 3:

$$y_{1t} = \mu_1 + \mu_2 \varphi_{t\tau} + \beta t + \alpha^T y_{2t} + e_t \qquad t = 1,.....,n. \qquad (7)$$

Model 4:

$$y_{1t} = \mu_1 + \mu_2 \varphi_{t\tau} + \alpha_1^T y_{2t} + \alpha_2^T y_{2t} \varphi_{t\tau} + e_t \qquad t = 1,.....,n. \qquad (8)$$

The above four models are expressed as the standard model in which there is no structural fracture, the level shift model (C), the level shift with trend model (C / T) and the regime shift model (C / S). First of all, in Model 2, which includes level shift, in Model 3, which includes level shift with trend and in Model 4, which shows the regime shift; μ_1 represents the intercept before the shifting, and μ_2 represents the change in the intercept at time of the shift. In addition, α_1 in Model 4 is the slope coefficient before the regime shift, and α_2 is the change in the slope coefficient. $\varphi_{t\tau}$ in the Model 2, Model 3 and Model 4 is the dummy variable expressing the structural break point and can be defined as follows (Gregory and Hansen, 1996: 102-103);

$$\varphi_{t\tau} = \begin{cases} 0 \text{ if } t \leq [n\tau] \\ 1 \text{ if } t > [n\tau] \end{cases}$$

Here, $\tau \in (0,1)$ denotes the timing of the change point, and [ ] denotes integer part. Gregory and Hansen (1996) test statistics (Za*, Zt*, and ADF) for the appropriate model in cointegration analysis can be tested against the table critical values to check for cointegration. While the null hypothesis states that there is no long-run relationship between variables, the alternative hypothesis states that there is a cointegration relation between variables with a structural break.

Table 3. Gregory and Hansen (1996) Cointegration Test Results

Models	ADF Test Statistics	% 5 Critical Value	Break Period
Level Shift (C)	-10,88 (0)	-5,56	2010m5
Level Shift with Trend (C/T)	-11,09 (0)	-5,83	2008m7
Regime Shift (C/S)	-10,89 (0)	-6,41	2010m5

Note: 1- The values in parentheses indicate the appropriate lag length of the AIC.
2- 5% Critical values were taken from Gregory and Hansen (1996: 109).

Table 3 shows the results of the cointegration test of Gregory and Hansen (1996) taking structural breaks into account. When the results obtained are examined, despite the fact that in the models of level shift and regime shift, there is a break in May 2010, it appears that there is a cointegration relation between the series since the ADF test statistic is higher than the critical value. Similarly, in the level shift with trend model, although there is a break in July of 2008, the series is moving together in the long run.

As well as 2008 is important for the reason that it is the year when the crisis began in the global economy, more important factor that led to capital outflows from Turkey is the amendment in the Decree No. 32 on the Protection of the Value of the Turkish Money. With the amendment on February 8, 2008, the obligation to convert the foreign currency that had got after exportation by citizens of the Republic of Turkey to Turkish Lira by bringing the country has been removed. In May, June and July, the net errors and omissions account had a significant negative balance. Depending on this situation; with the Law No. 5811 issued on November 22, 2008 after the global crisis

started, the "asset peace" application was initiated in order to bring some foreign assets to the economy.

2010 is regarded as a period of recovery after the global crisis period. During this period, as well as in the first half of 2008, there was a period in which domestic residents increased their foreign assets and net errors and omissions accounted for a negative balance.

3.3.Causality Tests

As a result of the cointegration analysis made in the previous section, the cointegration relation between the variables in equation 1, in which the determinants of the Net Error and Missing Account are examined, is found. Although the cointegration between variables show that they move together in the long run, according to Oladipo and Akinbobola (2011: 5); relations related to regression analysis do not give information about causality relation between variables and direction of causality. This deficiency can be eliminated through causality tests.

The most commonly used causality test in the literature, which analyzes the causality relationship between variables in econometric studies is the test have been developed by Granger (1969). The Granger (1969) causality test is based on the estimation of the following two VAR models.

$$X_t = \alpha_0 + \sum_{j=1}^{m} \alpha_j X_{t-j} + \sum_{j=1}^{m} \beta_j Y_{t-j} + \varepsilon_t \qquad (9)$$

$$Y_t = \chi_0 + \sum_{j=1}^{m} \chi_j Y_{t-j} + \sum_{j=1}^{m} \delta_j X_{t-j} + \eta_t \qquad (10)$$

The error terms εt and ηt in the models are irrelevant. m indicates the appropriate lag length, which is smaller than the current time series size (Granger, 1969: 431).

According to the Granger causality test, the first equation shows the causality from Y to X, and the second equation shows the causality from X to Y. In the Granger causality test, first, the lagged values of the dependent variable are included as the model independent variable by the number of the appropriate delay (m). Then the other variable with the same number of lags is included in the model. In determining the appropriate number of lags, information criteria are utilized. The β coefficients in the first equation and the δ coefficients in the second equation are tested whether they are collectively meaningful with the lagged terms using the Wald test (H_0: $\beta_1=\beta_2=\ldots=\beta_j=0$ ve H_0: $\delta_1=\delta_2=\ldots..=\delta_j$). The F statistic obtained as a result of the Wald test is compared with the F table values to determine whether the coefficients are different from zero. The F statistic, which tests the null hypothesis in the above models are expressed as the Granger causality statistic and the test made in relation to this is also referred to as the Granger causality test (Granger, 1969; Stock and Watson, 2011: 552).

An important problem in the Granger causality test; the way of causality is significantly dependent on the number of contained lag terms and it is likely that the causality relationship that would arise in the case of using non-stationary series is false (Gujarati, 2006: 622; Menyah and Walde-Rufael, 2013: 274). Dolado and Lütkepohl (1996) have developed an alternative method to eliminate such problems. The causality test developed by Dolado and Lütkepohl (1996) is basically based on the Granger (1969) causality test. But the difference from the Granger (1969) approach is to remove the problems that may arise in the Granger (1969) causality test by adding additional lags to the appropriate lag lenght (m) expressed in Equation 9 and Equation 10. In the application of Dolado and Lütkepohl (1996) causality test, first the appropriate lag length (m) is determined. (m + 1) lagged VAR model is estimated by adding 1 to the appropriate lag length in the second stage. After the model is estimated, the Modified Wald (MWALD) test is applied to the first (m) lags (Dolado and Lütkepohl, 1996: 1). The F statistic obtained from the Wald test, just as in the Granger (1969) causality test, is compared with F table values to determine whether the coefficients are different from zero. The zero hypothesis shows that there is no causality. The results of the Dolado and Lütkepohl (1996) causality test are shown in Table 4.

Table 4. Dolado and Lütkepohl (1996) Causality Test Results

Way of Causality	Lag Lenght (m+1)	F Statistics (Prob.)	Result
NEOM → FEA	1+1	0,066 (0,7973)	No Causality
FEA → NEOM	1+1	1,845 (0,1766)	No Causality
NEOM → GDP	2+1	0,193 (0,8243)	No Causality
GDP → NEOM	2+1	1,818 (0,1664)	No Causality
NEOM → RER	1+1	2,630 (0,1072)	No Causality
RER → NEOM	1+1	0,641 (0,4247)	No Causality
NEOM → INT	1+1	0,247 (0,6199)	No Causality
INT → NEOM	1+1	0,001 (0,9689)	No Causality

Note: 1-The SIC criterion was used in selecting the lag length.
2- Except for the net errors and omissions (NEOM) variable, the causality results of the variables among other variables are not included.

As shown in Table 4, only mutual causality between net error and omission variable and other variables is examined. The results show that there is no mutual causality relationship between the variables of foreign exchange deposit, industrial production index, real exchange rate, interest rate and the net errors and omissions.

4. CONCLUSION

The net error and omission account is an item used for balancing transactions that create imbalance or uncertainty in the balance of payments. Whether it is due to timing, measurement and compilation mistakes, or hot money inflows, it is important that countries carefully monitor changes taking place in the net errors and omissions. In Turkey, The Central Bank of the Republic of Turkey, through reports published, follows and tries to predict the fluctuations in the net errors and omissions account. In this study, macroeconomic variables affecting the net errors and omissions account were tried to be determined with the aid of the empirical model which is based on a different way and with reference to the studies in the literature from the monthly data for 2006-2017 period.

When the obtained model results are examined; the net errors and omissions, foreign exchange deposits, industrial production index, real exchange rate and deposit interest rate up to one year are cointegrated in the long run. When causality relations between the net errors and omissions and the other variables are examined, Dolado and Lütkepohl causality test results show that there is no causality between the variables.

Especially, the close relationship, highlighted in the Central Bank of the Republic of Turkey Balance Sheet Reports between foreign exchange deposits movements and the net errors and omissions account have not been confirmed for the period 2006m1-2017m9. Similarly, The results obtained by Tang (2013), Alagoz (2014) and Zhang (2015) in the literature were shown as not

applicable to Turkey. Only a close finding could be reached that Siranova and Tiruneh (2015) had no relationship between the net errors and omissions and exchange rate. On the other hand, a relationship between the net errors and omissions and industrial production index has not been reached has seen that the net errors and omissions are not sensitive to developments in the real sector in the period concerned.

When concerning Turkey's net errors and omissions account data, especially from 2008 onwards, it has seen that fluctuations are intensifying. However, depending on the model results, it is considered that the net errors and omissions do not depend on speculative hot money inflows. Because there is no causality between the domestic interest rate, the exchange rate and the net errors and omissions account. Hot money movements are very sensitive to interest rates in the expected return range and exchange rate movements in the expected risk frame.

It can be considered that one of the main factors causing high negative or positive balance is that the high negative or positive balance is the collected statistical data are poor in reliability. But rather, unspecified cash inflows and outflows can be reflected in the net errors and omissions. In particular, the political turmoil or war environment in the Middle East since 2010 has reinforced the likelihood of monetary moves toward Turkey as a safe haven.

As examined empirically, the net errors and omissions account in Turkey may reach serious proportions as a negative or positive and seems not to be associated with certain macroeconomic variables. This

increases the uncertainty for Turkey's economy. For this reason, it is important to discuss the subject in more detail through different models by both the Central Bank of the Republic of Turkey and the other researchers.

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CHAPTER 7:

THE CAUSALITY RELATIONSHIP BETWEEN ECOLOGIC FOOTPRINT AND TOURISM ACTIVITIES IN TURKEY

Assoc. Prof. Cemil Serhat AKIN[1]

Assoc. Prof. Cengiz AYTUN[2]

[1] Hatay Mustafa Kemal University. F.E.A.S. Department Economics csakin@mku.edu.tr

[2] Hatay Mustafa Kemal University. F.E.A.S. Department of Finance, cengizaytun@mku.edu.tr

INTRODUCTION

While the share of tourism revenues in national income has increased in recent years, the effects of this increase on the environment has not been questioned sufficiently. While global warming is mostly associated with energy consumption and fossil fuel consumption, the question of where these consumptions take place is neglected. The World Tourism Organization declared in 2003 that there is a relationship between tourism activities and global warming (Djerba 2003). In the published declaration, the relationship is expressed in two ways. While 10% of the national income generated in the world consists of tourism revenues, the impact of these activities on the formation of greenhouse gas is about the same level (UNWTO, 2015).

Today, the most important cause of global warming is the use of fossil fuels such as coal, oil and gas as primary energy sources. Fossil fuels, which are responsible for 80% of global warming, contribute to the formation of Green House Gas (GHG), which is seen as the most important reason behind climate change.

In studies on environmental degradation, carbon emission indicator is frequently used as an indicator of environmental quality. This variable has limited capabilities to represent environmental quality. For this reason, more recent indicators have begun to use better indicators such as ecological footprint is one of them. Ecological footprint is included in national footprint and biological capacity calculations.

2. National Footprint and Biological Capacity Calculations

National Footprint and Biological Capacity Calculations (NFAs) provide essential data for all Ecological Footprint analyzes in the world. These calculations measure the natural resource capacity of countries over time as well as the use of ecological resources. The national footprint, which began to be calculated by 1961, is now being calculated for more than 200 countries. Calculations in the National Footprint and Biological Capacity Calculations are based on data from the United Nations, United Nations Food and Agriculture Organization, United Nations Trade Statistics Database and the UN Department of Statistics and the International Energy Agency.

Ecological Footprint is obtained by monitoring the biological area used to meet the needs of people. Basically, these traces are pollution that people leave in nature after their activities. Thanks to these impressions, we can compare the Ecological Footprint resulting from human activities with the amount of natural resources that we can produce in the same period. Thus, we can see whether the natural resources (biological capacity) live within the limits of self-renewal. The erosion caused by the energy used while meeting the basic needs of people such as food shelter and dressing reduces the biological capacity.

When calculating biological capacity, it is also possible to calculate carbon dioxide emissions from fossil fuel use. In addition, import and export volumes are also considered. International trade flows can be seen as embedded ecological flows in a sense.

Natural resources (eg agricultural products, fish, etc.) used by humans in the calculation of biological capacity and Ecological Footprint are handled separately according to the land types that provide these resources (agricultural land, fishing areas, etc.). The footprints of the countries are analyzed in six different categories according to land types such as carbon capture area, agricultural area, forest, grazing area, fishing area and structured area.

The Ecological Footprint is usually measured in global hectares (Gha). Because trade is global, an individual or country's Footprint includes land or sea from all over the world. Without further specification, Ecological Footprint generally refers to the Ecological Footprint of consumption. Ecological Footprint is often referred to in short form as Footprint. "Ecological Footprint" and "Footprint" are proper nouns and thus should always be capitalized.

Global hectares are the accounting unit for the Ecological Footprint and Biocapacity accounts. These productivity weighted biologically productive hectares allow researchers to report both the biocapacity of the earth or a region and the demand on biocapacity (the Ecological Footprint). A global hectare is a biologically productive hectare with world average biological productivity for a given year. Global hectares are needed because different land types have different productivities. A global hectare of, for example, cropland, would occupy a smaller physical area than the much less biologically productive pasture land, as more pasture would be needed to provide the same biocapacity as one hectare of cropland. Because world

productivity varies slightly from year to year, the value of a global hectare may change slightly from year to year.

3. Relationship between tourism and environmental degradation

As a result of economic and social growth, the demand for products and services is increasing day by day. Especially the service sector takes its share from the increasing demand and tourism sector comes to the forefront among these sectors. In general, increasing tourist demand and increasing energy demand and water consumption cause significant environmental degradation (Kreag, 2001). Most of the activities related to tourism use fossil fuels, which are the primary source of energy, which is mainly used for electricity and transportation.

The continuous growth of the tourism sector, which contributes to the carbon emission in the world, leads to the establishment of various organizations for planning purposes. The organizations of the United Nations World Tourism Organization (UNWTO,2015), the United Nations Environment Program (UNEP) and the Organization for Economic Cooperation and Development (OECD) were established to question the impact of tourism on the environment and in particular to examine its impact on climate change.

While global tourism represents 7% of global exports, it is a trillion dollar industry that makes a significant contribution to global gross domestic product (GDP). The tourism sector, which grows by 4% on average, outperforms other sectors every year (WTO, 2018).

According to a recent study (Lenzen et al., 2018), the global carbon footprint of tourism in 2009 and 2013 increased from 3.9 to 4.5 Gt. CO2 emissions from the tourism sector have already exceeded 4 times the projections already made. The effect of tourism sector on the formation of greenhouse gas is 8% (WTO, WMO and UNEP, 2009).

In 2035, the tourism sector will become the 5th largest pollutant in the world in terms of carbon emissions. This figure has increased by 100% in the last 10 years (WTO, WMO and UNEP, 2009). While international tourism contributes to national income as an export item, it deteriorates to a greater extent the environmental degradation. In the study for New Zealand, international transport activities consume four times more energy than domestic tourism (Becken et al. 2003). A similar study was carried out for the new Sweden and it was found that the contribution of tourism activities to carbon emissions was four times higher than the pollution created by the goods produced in the Swedish economy. In particular, air transport, which is a sub-sector of tourism, is responsible for 80% of the resulting emissions (Perch-Nielsen, Sesartic and Stucki, 2010). In the study conducted for Spain, one of the countries where tourism revenues occupy an important place in its economy, it has been revealed that tourism activities are an important determinant of greenhouse gas (Cadarso et al., 2016).

Although the energy used for transportation is considered to be the most contributing factor to environmental degradation, many indirectly related activities contribute significantly to the formation of greenhouse gas. Especially accommodation and entertainment

activities are sectors with high energy density. It contributes significantly to environmental degradation in the heating, air conditioning, maintenance of restaurants, cleaning of pools, laundries and similar services (Michailidou, Vlachokostas, Moussiopoulos, & Maleka, 2015).

In a comparative study conducted in the Canary Islands, the increase in the diversity of services provided in hotels increases carbon emissions. Diaz et al. Found that the consumption levels of high-star hotels are higher and the emission emission is high. Compared to the carbon emissions of three-star and five-star hotels, five-star hotels emit five times more than three-star hotels (Díaz, Pérez et al., 2018). Similarly, Puig et al. Stated that the electricity consumption of five-star hotels generates more than 50% of the total greenhouse gas generation. (Puig et al., 2017).

4. Method

The data will be used in practice will be held in Turkey it was obtained from Ecological Footprint Network and Turkey Travel Agencies Union. Data were collected annually for 1969-2016 period. The definitions of the data are presented in Table 1.

Table 1. Data Definitions and Sources (1969-2016, Annual)

Code	Definitions	Source
EF	Total Ecological Footprint of consumption in global hectares (gha)	EFN[a]
TI	Tourism income (USD)	ATTA[b]
TI_S	Tourism income share in GDP (%)	ATTA[b]

[a] Ecological Footprint Network Database 2019 (http://data.footprintnetwork.org/#/analyzeTrends?type=EFCtot&cn=223) Accessed 20.09.2019 [b]Association of Turkish Travel Agencies (https://www.tursab.org.tr//assets/img/turizm-verileri/turizm-geliri-1969-2018.xls) Accessed 20.09.2019.

In this study we analyzed the causal relationship between gross domestic product and tourism income and expenditure. According to the causality test developed by Granger (1969) a dependent variable (Y_t) can most effectively be explained by its lagged values (such as Y_{t-1}, Y_{t-2}, Y_{t-3}). The idea of explaining an economic phenomenon with its past values is consistent with economic common sense. But, in this type causality analysis, each series in the model must be stationary. WALD test statistics for non-stationary cointegrated series do not fit asymptotic chi-square distribution. Due to WALD test statistic has a chi-square asymptotic distribution this approach cannot be applied in non-stationary series. Testing by differenced variables may be a solution. However, this method loses the long-term information. The results of the causality test with differenced variables can be interpreted for short-term. To overcome this problem, Toda and Yamamato (1995) (TY) has developed modified WALD test (MWALD). Non stationarity or cointegration relationship situations of the variables does not affect the significance and validity of the test. Testing by variables in level form also preserves the long-term information. Therefore, causality test

results can be interpreted for long-term. Optimal lag number (p) is obtained from the VAR model. Additional lags are used for modifying the WALD test statistics. Maximum number of integration order (d) is determined by the unit root tests. TY-VAR(p+d) model (Eq.1-2) is estimated for p+d lags by OLS or SUR estimator. In the application we used the logarithmic forms of series. Letter "L" in front of the variables indicates logarithmic transformation.

$$LEF_t = \alpha_0 + \sum_{i=1}^{p+d} \beta_i LEF_{t-(p+d)} + \sum_{i=1}^{p+d} \theta_i LTI_{t-(p+d)} + e_t \quad (1)$$

$$LTI_t = \delta_0 + \sum_{i=1}^{p+d} \vartheta_i LTI_{t-(p+d)} + \sum_{i=1}^{p+d} \mu_i LEF_{t-(p+d)} + \varepsilon_t \quad (2)$$

With these additional lags MWALD test statistics fits chi-square asymptotic distribution. Then the significance of the lagged coefficients tested together for p lags (H_0 for MWALD : $TI \nrightarrow GDP$, $\theta_1 = \theta_2 = \cdots = \theta_p = 0$). Rejecting H_0 means that TI significantly causes GDP in Granger sense with Toda and Yamamato (1995) MWALD modification.

But simulation studies made by Hacker and Hatemi-J (2006) showed that MWALD statistics is biased for the rejection H_0 hypothesis. According to the study, in the conditions of small sample size and error term processes (homoscedasticity or ARCH) MWALD test performs poorly. To solve this problem, they suggest using critical values obtained leveraged bootstrap distribution developed by Efron (1979). Monte Carlo simulation results for bootstrap method prove that

an MWALD test based on a bootstrap distribution has much smaller size distortions than corresponding situations when the asymptotic distribution is employed. These results hold for various sample sizes, integration orders, and error term processes (homoscedastic or ARCH). For these reasons in our application we employed bootstrap causality test developed by Hacker and Hatemi-J (2006).

5. Results and discussion

The TY based causality approach requires the information of the maximum integration degree of the series in the VAR (p+d) model. The application starts with testing whether the series contain a unit root. For define the maximum integration level of the series we simply applied ADF (Dickey and Fuller, 1979) and PP (Phillips and Perron, 1988) unit root tests to the series. Table 2 reports ADF and PP unit root test results. According to the results Ecologic Footprint (LEF) is stationary for both ADF and PP tests. On the other hand, both Tourism Income (LTI) and Tourism Income Share in GDP (LTI_SH) have unit root process. Results also indicates that these two series are stationary at first difference. Consequently, maximum number of integration order (d) was accepted as 1.

After the defining maximum integration order of series, bootstrap TY-VAR (p+d) causality test results are reported in Table 3. The series are used in the test at level form. Therefore, the results indicate a long-term causality relationship. The probability values obtained for asymptotic distribution and critical values for bootstrap distribution are also presented in the table.

Table 2. ADF and PP Unit Root Test Results

ADF Results	**At Level**		**At First Difference**	
Series	Test Stat.	Prob.	Test Stat.	Prob.
LEF	-5.0883***	0.0007	-	-
LTI	-1.0098	0.9328	-5.6590	0.0001
LTI_SH	-1.9864	0.5934	-5.1872	0.0006
PP Results	**At Level**		**At First Difference**	
Series	Test Statistics	Prob.	Test Stati.	Prob.
LEF	-5.0856***	0.0007	-	-
LTI	-0.8295	0.9553	-6.1663	0.0000
LTI_SH	-2.0373	0.5662	-9.2889	0.0000

Notes: H_0: No unit root. ***, **, and * denote rejection of null hypothesis at statistical significance level 1, 5, and 10 percent respectively. Optimal lag numbers for ADF (1979) unit root test based on Schwarz-Bayesian information criterion. Optimal bandwidth for PP (1988) test is selected by Newey-West method. Bartlet kernel is used for spectral estimation. The reported ADF and PP test statistics calculated for the model with constant and trend.

Table 3. Bootstrap Causality Test Results

H_0	MWALD	Asymptotic chi-square p-value	Critical Values for the Leveraged Bootstrap Test			Optimal Lags for VAR Model	Decision
			% 1	% 5	% 10		
$LTI \nrightarrow LEF$	**7.408**	0.025	11.675	6.867	5.036	2	Rejected**
$LEF \nrightarrow LTI$	0.974	0.614	10.474	6.592	4.868	2	Accepted
$LTI\_SH \nrightarrow LEF$	**5.366**	0.068	10.591	6.588	4.933	2	Rejected*
$LEF \nrightarrow LTI\_SH$	1.358	0.507	10.129	6.486	4.916	2	Accepted

Notes: Bootstrap p-values are based on 10,000 repetitions. According to unit root test results, the maximum order of integration is one (d = 1). Optimal lag numbers for the VAR model based on HCJ information criterion (Hatemi-J, 2003). ***, **, and * denote rejection of non-causality hypothesis at statistical significance level 1, 5, and 10 percent respectively.

According to findings, the null hypothesis that there is no causality in the test from Tourism Income (LTI) to Ecologic Footprint (LEF) was rejected at 5% significance level with bootstrap critical values. Conversely, the null hypothesis that there is no causality from Ecologic Footprint (LEF) to Tourism Income (LTI) could not be rejected. Similar findings are also valid for the causality relationship

between Tourism Income Share (LTI_SH) and Ecologic Footprint (LEF). The result obtained from bootstrap critical values are consistent with the results from asymptotic probability values. The findings strongly indicate that there is a unidirectional causality relationship from tourism income variables to ecologic footprint for 1969-2016 period in Turkey. It is seen that Turkey's tourism revenues increased continuously with Ecologic Footprint. Therefore, tourism activities can be considered as an important factor. of environmental degradation.

While it is not possible to prevent environmental degradation, it may be possible to slow down. The way is to create sustainable, environmentally friendly and responsible tourism policies in which all sectors participate. In particular, urban green tourism (eco-tourism) policies need to be supported by relevant policy makers. Also emphasized by UNWTO, it is emphasized that while making a city fun for everyone in tourism, it is necessary to strengthen urban management within the framework of urban benefits among its residents.

Policies to prevent environmental degradation While developing these policies, it is essential to follow these policies, especially due to the continuous increase in the share of tourism in national income, continuous monitoring and analysis of related carbon emissions becomes even more important. The carbon footprint of tourism should be continuously evaluated. A separate policy should be developed for each tourism activity that is thought to generate carbon. It is not only the carbon footprint of fossil fuel use

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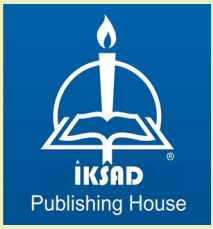

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